

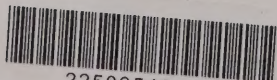
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ANNUAL REPORT

**The Burroughs Wellcome Fund
is an independent
private foundation
established to advance
the medical sciences
by supporting
research
and other scientific
and educational activities.**



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1997 ANNUAL REPORT

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*Depicted in BWF's
logo, the eye of the
ancient god Horus
is widely considered
a symbol of health*

History of the Burroughs Wellcome Fund

*A revolution takes
place in pharmacy*

The Burroughs Wellcome Fund, created in the United States in 1955, has roots in nineteenth-century England, where two young American pharmacists formed a partnership to establish an innovative pharmaceutical company.

Silas Burroughs and Henry Wellcome, both of whom were educated in the United States and had represented American drug companies in the United Kingdom, recognized that a revolution then taking place in the U.S. pharmaceutical business offered great opportunity for expansion and success abroad. This revolution, which had originated in England but was finding its fullest expression in the United States, centered on the development of “compressed” medicines—pills—that could be mass-produced and packaged for wide and rapid distribution. Because they delivered standardized, reproducible dosages, these new tablet formulations were viewed as being safer and more effective than the common potions and powders of the day.

The two men formed their partnership in London in 1880, and their enterprise—known as Burroughs Wellcome and Co.—prospered. After Silas Burroughs died in 1895, Henry Wellcome directed the growth of the company into an international network, with notable expansion in the first two decades of the twentieth century. New subsidiaries were opened on several continents and in numerous countries, including the United States. As the business grew, Wellcome held firm to his strong belief that research was basic to the development of excellent pharmaceutical products—a belief he put into practice by establishing the industry’s first research laboratories.

In 1924, Wellcome consolidated all of the company’s holdings, both in England and abroad, under a corporate umbrella that he named The Wellcome Foundation Ltd. The scope of the activities involved—including businesses, museums, libraries, and numerous research projects on several continents—is a measure of Henry Wellcome’s vision, energy, and contribution to international science. This was acknowledged by many honors, including a knighthood conferred on him in 1932 by King George V.

*Birth of the
Burroughs
Wellcome Fund*

When Sir Henry died in 1936, his will called for vesting all of the corporate shares in a new entity—the Wellcome Trust. The Trust’s charge was to devote all of its income to research in medicine and allied sciences and to the maintenance of research museums and libraries dedicated to these fields. Over the decades, the Trust has supported a vast array of biomedical research in the United Kingdom and other selected regions of the globe, and the Trust has grown to become the world’s largest charitable foundation devoted exclusively to the biomedical sciences.

In 1955, Sir Henry Dale, one of the Trust’s original trustees and its chair for 21 years, and William N. Creasy, president and chairman of Burroughs Wellcome Co.-USA, envisioned a U.S. extension of the Wellcome Trust—and so was born the Burroughs Wellcome Fund, which would be supported by the U.S. company. Both men saw the Fund as a natural extension of Henry Wellcome’s will and its intent, as well as an acknowledgment of his native land and the great success of the American branch of the Wellcome enterprise. For nearly 40 years as a corporate foundation, the Fund focused its modest financial resources in selected areas to advance scientific knowledge.

In 1993, the Fund received from the Wellcome Trust a \$400 million gift that altered BWF's very nature. The gift enabled BWF to become a completely independent foundation, with no direct ties to its founding company. (Nor is BWF affiliated in any way with what came to be Glaxo Wellcome Inc., which emerged in 1995 when the pharmaceutical company Glaxo acquired all of the Wellcome commercial holdings.) The Fund stands as an independent private foundation whose mission is to advance the medical sciences by supporting research and other scientific and educational activities. Aided by the Trust's gift, BWF now pursues an enhanced role in biomedical research in the United States and has expanded its support to include Canada.

*BWF expands
support to include
Canada*

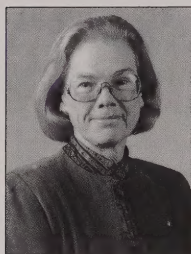
The list of individuals on both sides of the Atlantic who participated in instilling the Wellcome legacy in the Burroughs Wellcome Fund is a long one. William Creasy remained at the Fund's helm for more than a decade, guiding development of the Fund's mission and scientific activities. William Dowling, who had developed the legal structure of the Fund, served as its chair from 1971 until 1974. George Hitchings, Ph.D., a Nobel laureate who spent most of his career with Burroughs Wellcome Co., served as BWF's president from 1974 until 1990, and his leadership strongly reinforced the Fund's belief in the essential link between basic research and practical applications in medicine. And Howard Schaeffer, Ph.D., a pioneering chemist who chaired BWF from 1991 until 1994, played a significant role in bringing about the Wellcome Trust's gift to the Fund.

The importance of curiosity-driven research, as endorsed by Henry Wellcome in the early years of the century, continues to guide the Burroughs Wellcome Fund. BWF seeks to accomplish two primary goals through its programs: to help outstanding scientists early in their careers develop as independent investigators, and to advance fields in the basic medical sciences that are undervalued or in need of particular encouragement. In carrying out this work, the Fund is governed by a Board of Directors composed of distinguished scientists and business leaders, and its competitive award programs are directed by advisory committees composed of leading researchers and educators.

*The importance
of curiosity-driven
research*

Thus, more than a century after two enterprising American pharmacists set in motion their pioneering partnership, the Burroughs Wellcome Fund remains committed to the belief that fostering research by the best and brightest scientists offers the fullest promise for improving human health today and in the new millennium.

Message from the President



Enriqueta C. Bond,
Ph.D.

*New ways of
training scientists
and supporting
science*

The mission of the Burroughs Wellcome Fund is to advance the medical sciences by supporting research and other scientific and educational activities in the United States and Canada. Within this broad mandate, we place primary emphasis on basic biomedical science—research aimed at discovering fundamental knowledge that will underpin broader efforts to improve human health and well-being. To carry out this mission, our general strategy is to support the development of outstanding U.S. and Canadian scientists early in their careers and to support investigators working in or entering areas of science that are undervalued or underfunded. One area of special emphasis in BWF's programs is promoting interdisciplinary research. We believe that some of the most interesting science takes place at the boundaries of disciplines, where experimental approaches, ways of thinking, and discoveries from one field can be applied to another.

This report lays out BWF's rationale and describes how we try to foster interdisciplinary research and training in our award programs. The following report, by Martha G. Peck, BWF's vice president for programs, provides greater detail about our various activities.

Importance of Interdisciplinary Research

Many disciplines of science and engineering are undergoing rapid and pervasive change, and many aspects of modern life are increasingly dependent on emerging technologies and the scientific frameworks from which they evolve. Urgent new public health needs, expanded economic competition, and a growing global awareness of environmental deterioration bring a blossoming of opportunities for varied careers in science. Our health and science professionals are expected to expand fundamental knowledge and make that knowledge useful in the world. At the same time, the world of work has become more interdisciplinary, collaborative, and global, which requires us to produce young scientists who are adaptable, flexible, and technically proficient. This calls for a new way of thinking about the scientists we train and the way we support science—and especially about how we can encourage growth in interdisciplinary research.

In a recent speech to the National Academy of Sciences, Dr. Bruce Alberts, the academy's president, noted the need to foster interdisciplinary research in order to increase the effectiveness of the entire scientific enterprise. "Even those of us in the midst of the dramatic biological discoveries of the past 30 years were incapable of foreseeing the powerful ways in which different bits of scientific knowledge could be combined," he said. "But with increasing knowledge, a critical problem develops that retards the potential growth of science. Specialization reduces what each of us knows about other fields of science, and it greatly inhibits our ability to make new connections [with other fields]." Or as Dr. Paul Weisz, a researcher at the University of Pennsylvania, noted to the American Chemical Society on the interdisciplinary challenge: "As researchers, we generally keep drilling deep in our own specialty parcels, with but occasional excursions to adjacent fields. Our institutions (organizational units, departments, course structures, journals, funding organizations, 'peer' groups, etc.) are neatly subdivided, categorized, organized. All these factors,

by interdependence and mutual perpetuation, mold the character of education, attitudes, professional language, and the opportunities as well as constraints in the choice, type, and execution of research, career, and the structure of knowledge, etc.” Yet society and science need interdisciplinary research and the applications of knowledge from one field to another. BWF’s Board of Directors believes, in particular, that ways must be found to make the necessary connections among disciplines to benefit advances in biology and biomedicine.

The value of establishing such “connections” among fields is readily apparent when one examines some recent findings that are especially compelling. Scientific advances now make it possible to analyze complex biological phenomena, including disease processes, in terms of basic physical and chemical interactions of molecules. Some of the most promising recent discoveries in biomedicine have resulted from the insights and discoveries of investigators with strong backgrounds in physics, chemistry, and mathematics. Examples of such interdisciplinary research include the use of x-ray diffraction to analyze the interactions between drugs and enzymes, the use of advanced magnetic resonance imaging to see where information is processed in the brain, and the mathematical analysis of human genome sequences for biologically meaningful information.

A recent article by Dr. Steven Benowitz in *The Scientist* calls interdisciplinary collaborations “a wave of the future.” As science becomes increasingly more complex, interdisciplinary research at many academic institutions is moving toward becoming the rule rather than the exception. At the same time, many scientists and administrators warn, there are road blocks to such collaborations that need to be eliminated. Traditional university departments can be barriers, especially when peer review, promotion, and tenure are not structured to advance interdisciplinary collaboration. Funding agencies whose very organizational structures have been allied to a discipline-specific academic model find it difficult to handle collaborative research proposals—although this, too, is changing as such agencies as the National Science Foundation find effective mechanisms to address and support interdisciplinary efforts. Still, if we are to maximize scientific and technological developments, it remains essential that we find new and better ways to foster the flow of knowledge and inventions, as well as the “flow” of gifted individuals, across conventional academic and industrial boundaries.

Successful interdisciplinary research involves the active cooperation of scientists with diverse but relevant backgrounds, who contribute their individual talents and expertise to addressing complex problems of mutual interest. Collaborative research flourishes in academic environments that have a free flow of communication and active interdepartmental programs that are recognized and encouraged by faculty peers and institutional administrators. In addition, successful collaboration requires some extra effort from individual researchers, who often must adapt to unfamiliar scientific cultures and overcome impediments imposed by specialized scientific language and jargon, as well as by differences in academic traditions, budgetary priorities, sources of funding, and approaches to research among the relevant disciplines.

How does the Burroughs Wellcome Fund foster interdisciplinary training and research? We do this in several ways. One approach is to attract individuals with special talents and training that can benefit a field—for example, attracting someone well trained in combinatorial chemistry to pharmacology. A second approach is to

*Making connections
to foster advances
in biology and
medicine*

*Encouraging new
approaches and
novel thinking*

support individuals who bridge two different areas. Here, BWF specifically targets basic and clinical research, and we seek individuals who “creatively vibrate” between bench and bedside for patient benefit. A third approach is to help institutions break down barriers to providing interdisciplinary training in order to draw people well trained in physics, chemistry, and computational sciences into biology. All of these strategies flow naturally from the Fund’s goal of leveraging scientific investigation and knowledge—promoting creative interaction among scientists, as well as among disciplines, for the benefit of all.

Therapeutic Sciences and Emerging Infectious Diseases

Thinking outside the proverbial box has become a hallmark of BWF’s programs in therapeutic sciences and emerging infectious diseases. Several awards in these programs now target support for faculty members early in their careers who are well positioned to bring new approaches and novel thinking into their fields.

For nearly two decades, BWF has advanced the field of toxicology by supporting the work of established investigators. Through its Scholar Awards in Toxicology, BWF has developed a cadre of key researchers who have helped shape the landscape of the toxicological sciences. In 1996, BWF elected to build on this success by refocusing the Fund’s efforts in toxicology primarily on identifying and supporting talented scientists early in their careers. The Fund announced in 1997 its first round of New Investigator Awards in Toxicology. Similarly, BWF long has supported researchers in various aspects of pharmacology, and since 1996 we have focused primarily on supporting the development of talented researchers early in their careers in the basic pharmacological sciences.

In recognition of the important shared interests of pharmacology and toxicology, BWF now has united its support for these fields under a new program—the New Investigator Awards in the Pharmacological and Toxicological Sciences. Pharmacology and toxicology both are inherently multidisciplinary, and both are well-positioned to capitalize on the new ideas and experimental approaches emerging from such frontiers of investigation as the physical and computational sciences, combinatorial chemistry, structural biology, animal models (or the study of pharmacologic and toxicologic responses in integrated systems), genomics, and molecular genetics. Our awards are intended to give recipients the freedom and flexibility to engage in such interdisciplinary, perhaps higher-risk, research that holds potential for moving their respective fields in promising new directions. BWF believes that bringing these two areas more closely together through supporting the development of tomorrow’s leading scientists offers an effective way to strengthen and expand interactions between the pharmacology and toxicology communities.

*Advancing
knowledge of
parasitic and
fungal pathogens*

Similarly, BWF’s new investigator awards in molecular parasitology and in molecular pathogenic mycology are shaped to foster the growth of a cadre of researchers broadly trained to apply the latest scientific techniques in order to advance fundamental biochemical, pharmacological, immunological, and molecular biological knowledge of major parasitic and fungal pathogens. The Fund also has a program specifically aimed at research on malaria, by far the most widespread and dangerous of the parasitic diseases, and we expressly look for investigators—from within the field or from other fields—who will apply novel approaches to the search for effective methods to prevent and treat this disease. Thus, investigators who have a long track

record outside malaria may link strategically with a known malariologist to bring a particular approach or technology from a different field, to advance knowledge on this most complex disease.

Clinical Scientist Awards in Translational Research

Given BWF's pioneering efforts in support of clinical pharmacology in its early history, coupled with our board's interest in fostering interdisciplinary research, it was perhaps a natural step to focus on translational research—the two-way transfer between work at the laboratory bench and treatment of patients. Beginning in 1998, BWF has instituted a new program to support the career development of physician-scientists whose work bridges the gap between basic research and clinical care. Although recent years have seen an explosion of fundamental insights into the mechanisms of disease, transferring this knowledge into practical advances in health care has moved more slowly. One need only consider some of the advances reported in the popular press to realize the promise of these new discoveries. For example, with a population in which obesity is now a major health problem, we urgently need to translate the latest discoveries from molecular biology, such as the recent identification of genes that appear to control obesity, into effective methods of treatment. Intriguing papers on the molecular actions of cytokines, or cellular hormones, are filling scientific journals these days, but what do they mean for disease causation and new treatments? Such problems require the attention of clinician-scientists.

*Critical gap
between basic
research and
clinical care*

Changes in the financing of medical research and health care further threaten to undermine the translation of knowledge gained from basic research into new or improved medical therapies. The rapid growth of managed care, for example, has meant that many academic medical centers, which historically have been at the forefront of both basic and clinical research, have seen declining sources of revenue to support research. Two studies published in the *Journal of the American Medical Association* on July 16, 1997, provide documentation of this widely held belief. One study examined the growth in grants from the National Institutes of Health (NIH) to 115 medical schools for clinical and basic research. From 1986 to 1990, the number of grants grew at about the same pace for all medical schools. But from 1991 through 1995, grants grew more slowly among the 13 medical schools that faced the most competition for patients from health maintenance organizations. The second study showed that medical school faculty members in highly competitive health care markets are publishing fewer articles in peer-reviewed journals. In an accompanying editorial, Dr. Kenneth Shine, president of the Institute of Medicine, stated that he believes young faculty members are being forced to cut the amount of time they spend on research. He calls for financing additional clinical research through a 1 percent tax on all health care premiums, using this money to supplement, not replace, the current NIH budget.

According to a recent study by a special NIH Director's Panel on Clinical Research, chaired by Dr. David Nathan, this dilemma of declining clinical research is growing ever more pressing. As a result, many physician-scientists, who play a critical role in identifying and implementing advances in the basic sciences, have fewer financial resources, less time, and smaller patient populations available for clinical studies. Their universities are pressing them to spend more of their time in clinical service to generate dollars, and without other sources to cover salary, they are reluctant to release time for research. Thus, translational research is being impeded.

*Catalyzing growth
in interdisciplinary
training*

*Forging
international
connections
among scientists*

BWF's new translational awards are intended to help free outstanding physician-scientists from general clinical responsibilities and enable them to pursue the important link between basic and clinical research. With their newfound flexibility, recipients will be able to explore fundamental scientific questions, apply the resulting knowledge at the bedside, and bring insights from the clinical setting back to the laboratory for further exploration. Their research may draw on the many recent advances in the basic biomedical sciences—including such fields as biochemistry, cell biology, genetics, immunology, molecular biology, and pharmacology—that provide a wealth of opportunities for studying and alleviating human disease. These efforts, it is hoped, will lead to a better understanding of the mechanisms of disease, as well as to new methods of diagnosing, treating, and preventing disease. In this way, BWF hopes to catalyze the development of a cadre of experienced physician-scientists critically positioned both to bridge the gap between the bench and bedside and to train the next generation of investigators in translational research.

Interfaces between the Physical and Biological Sciences

In 1996, BWF began an initiative to help institutions catalyze graduate and post-doctoral training at the interface between the biological and physical sciences, to encourage the interdisciplinary training of students from the physical, chemical, and computational sciences so they can better apply their unique knowledge and talents to biomedical problems. As noted earlier, today's institutional organization along traditional scientific disciplines often impedes efforts to bring students fully trained in the physical and quantitative sciences into graduate and postdoctoral programs in the biomedical sciences. Much of the necessary infrastructure for providing such interdisciplinary training is in place at many institutions, but the institutions must be motivated to bring their units together, to lower barriers for interdisciplinary research, and to develop specialized curriculum and training programs. The goal of BWF's program is to support the breakdown of such barriers and to forge new interdisciplinary alliances. The program is not intended to introduce more graduate and post-doctoral students into the research system, but rather to promote a different kind of training and a change in institutional behavior. Emphasis will be placed on supporting new programs or existing programs that will change graduate and postdoctoral training in a meaningful way, as opposed to programs seeking more funding for conventional activities already under way.

Hands across the Sea

Research and education in science and medicine are becoming increasingly international in scope. Helping to set the global pace are such factors as the rise of rapid modes of electronic communications, the expanding scientific capacity throughout the world, and the emergence of new scientific problems that span our planet. Often, international structures and systems for collaboration are not well-designed to meet the needs of scientists. Through our Hitchings-Elion Fellowships, BWF supports the training of young U.S. and Canadian scientists in the United Kingdom and Ireland—which, it is hoped, will forge connections leading to longer-term collaborations. We also provide Wellcome Research Travel Grants to enable investigators at any time in their career, including during sabbaticals, to develop collaborations with U.K. scientists.

As a “sneak preview” of some exciting new international programs now in the wings, BWF’s sister charity in England, the Wellcome Trust, recently allocated \$5 million per year for each of the next five years for a collaborative effort between the two philanthropies to support research and training in the developing world. Planning has just begun to shape potential programs in two targeted areas: infectious diseases and reproductive science. Next year, there will be more to report on this wonderful opportunity to forge closer links between our organizations and our respective scientific communities, and to respond to critical needs identified by developing countries.

Supporting the Research Environment

BWF continues to believe that philanthropies have a potentially important role to play in advocating for improvements in the environment for research. Our efforts have included convening meetings devoted to selected scientific fields; disseminating information on the status of research programs; and supporting a variety of educational, training, and public information activities.

At the national level, the government’s latest bipartisan budget resolution, which sets broad spending guidelines to cut taxes and eliminate the federal deficit by the year 2002, leaves little room for an increase in research-and-development spending. There is, however, a bit of good news: recent months have brought welcome signs that these projections may be flexible, and there is a strong movement afoot to double the budget of the National Institutes of Health over the next five years. But the nation remains set for a strong battle over R&D funding in 1998 and the years ahead. BWF intends to do our part to articulate the importance of maintaining and increasing public support of research.

BWF also sees a role for advocating for private financial support of fundamental research. In February 1998, the Burroughs Wellcome Fund, in partnership with the Pew Charitable Trusts, the Howard Hughes Medical Institute, and the American Cancer Society, will hold a meeting to engage the attention of other private foundations and charitable institutions in supporting medical research. In 1996, private giving hit in excess of \$150 billion—but less than 5 percent of this total went to science and technology. If the needs of medical research and academic medical centers were better articulated and known to private givers, some of the huge transfer of wealth scheduled for this next generation might be captured to benefit an area where additional resources could be put to excellent purpose. As Dr. Ernest H. Starling noted in 1923 in the *Lancet*, “Only...by way of experiment can we hope to attain to a comprehension of the ‘wisdom of the body and the understanding of the heart,’ and thereby the mastery of disease and pain, which will enable us to relieve the burden of mankind.”

*Advocating for
improvements in
the environment
for research*

Emigilda C. Bond

Programs



Martha G. Peck
Vice President,
Programs

*BWF marks
record year in
grantmaking*

*Encouraging
outstanding
investigators*

Dr. Thomas Fuller, a physician, once said, "If you tell every step, you will make a long journey of it." The Burroughs Wellcome Fund took many steps in its programs and communications activities during the past year. Heeding the good doctor's sage advice, this report shares only some of the highlights that occurred along the way.

Most significant, BWF awarded more grants—in terms of both numbers and dollars—than ever before in its 42-year history. The Fund made more than 460 grants to U.S. and Canadian institutions, for a total of approximately \$39.5 million, exceeding last year's previous record total by some \$12 million. This record level of support reflects the continuing impact of the \$400 million gift to the Fund from the Wellcome Trust, BWF's sister philanthropy in the United Kingdom. The first installment of the gift arrived in 1993 and the final installment in fiscal 1997. The great majority of BWF's grants were made through competitive award programs in the Fund's targeted areas. Additional ad hoc grants were made to support specific activities that would add scientific value to these areas or enhance the general research environment to facilitate work in these areas.

BWF's 1997 awards are summarized in the table below. A more detailed "trip report" of activities in the Fund's major focus areas is provided in the following sections.

BWF AWARDS APPROVED, BY MAJOR PROGRAM AREA

Career Development	\$12,733,504
Emerging Infectious Diseases	7,048,700
Therapeutic Sciences	3,613,500
Reproductive Science	1,990,500
Interfaces between the Physical/Chemical/Computational Sciences and the Biological Sciences	10,000,000
Science Education	1,858,309
Environment for Science	2,301,690
TOTAL	\$39,546,203

* * *

Career Development

The cornerstone of BWF's support for scientists who are early in their careers is the Career Awards in the Biomedical Sciences program. During the 1997 award cycle, BWF made 19 career awards, for a total commitment of more than \$8.6 million. The goal of the awards is to enhance the scientific development and productivity of outstanding investigators at the postdoctoral level in order to help them make the critical transition to becoming independent investigators. Fifty-two individuals have received awards since the program began three years ago. BWF is pleased that almost half of the awardees have now won faculty appointments. It is hoped that the Fund's continuing support during their early faculty years will provide the awardees with the stability necessary to start their independent laboratories, attract graduate and postdoctoral students, and, most importantly, boost their ability to pursue new and innovative research.

In another career-development program, BWF awarded Hitchings-Elion Fellowships to nine postdoctoral scientists in the biomedical and behavioral sciences. The fellowships are named for Drs. George H. Hitchings and Gertrude B. Elion, both of whom have long been associated with the Fund and shared the 1988 Nobel Prize in Physiology or Medicine. The fellowships provide support for two years of research training in laboratories in the United Kingdom or Ireland and for a third year upon the awardees' return to the United States or Canada to continue training or begin a faculty appointment. BWF also awarded Wellcome Research Travel Grants to 40 researchers, including 11 researchers in the history of medicine, to enable them to visit colleagues in the United Kingdom or Ireland for shorter periods (two weeks to six months) in order to exchange scientific information or learn new research techniques. Both of these programs reflect the fact that science is an increasingly international endeavor, and they provide a means to build closer research collaborations among scientists on both sides of the Atlantic Ocean.

*Building
closer research
collaborations*

For upcoming award years, BWF has made several revisions to the Career Awards in the Biomedical Sciences and the Hitchings-Elion Fellowship programs. Beginning with the 1998 awards, recipients of career awards may spend part of the award period at an institution in the United Kingdom or Ireland. Beginning with the 1999 awards, the length of the Hitchings-Elion Fellowships will be extended to five years, which will permit both a longer research training period in the United Kingdom or Ireland and extended support for continued training or initial faculty service upon the awardees' return to North America.

In a first-of-its-kind activity for the Fund, in July 1997 BWF convened nearly 60 of its career-development awardees for a special two-day conference, held in Canada. Eight young scientists supported by the Medical Research Council of Canada also participated. The goals of the conference were to provide a forum for the awardees to share their research with one another, as well as with members of the Fund's Board of Directors and advisory committees; to strengthen the connections available to the awardees through their association with BWF; to increase their awareness of career-development issues; and to solicit feedback on the Fund's award programs. This meeting, which received a hearty thumbs-up from all quarters, is described in more detail beginning on page 18. As a brief summary, the young scientists identified three key concerns relating to career development: seeking and negotiating a faculty position, setting up and managing a laboratory, and facilitating academic-industrial collaborations. BWF is working to connect the scientists to resources in these areas—as well as to develop new resources for their career development.

*First-of-its-kind
meeting on career
development*

But what about the pudding? While BWF believes these programs are based on a recipe for success, where's the proof that the programs are achieving their objective of fostering career development? This year, the Fund's Board of Directors targeted evaluation for study. The board has approved the establishment of a BWF database that will permit timely tracking of awardees with designated outcome variables, supplemented by periodic surveys and citation analysis. This plan will augment BWF's current evaluation efforts, which include such activities as convening awardees and reviewing annual progress reports. As data become available, BWF will share the information with other groups and government agencies so that, working together, all can carry out their career-development activities in the most effective manner.

Emerging Infectious Diseases

*New treatments
needed for
parasitic and
fungal diseases*

The Fund's award programs in infectious diseases target parasitic and fungal pathogens, which despite advances in knowledge of their basic pathology continue to claim millions of lives annually. The problem is multifaceted—an increasing number of new cases coupled with few treatment options and increasing resistance to the available treatments, obstacles in developing new control and treatment strategies, and still unanswered questions about the basic molecular and cellular processes of these organisms. By supporting a cadre of early-career and mid-career investigators through new investigator and scholar programs, BWF hopes to bring new thinking and research approaches to the areas of molecular parasitology and mycology. The ten scholars and new investigators for 1997 are undertaking projects across a broad spectrum. Their efforts, for example, include probing how the parasites that cause leishmaniasis use special membrane “transporter” proteins to obtain food from the host, and searching the cell walls of disease-causing fungi for new components that might be targets for therapeutic attack.

Malaria, which each year claims more than 2 million lives worldwide, is targeted for special support through the New Initiatives in Malaria Research program. Five researchers received awards totaling \$900,000. Two researchers are working together to study the enzyme plasmepsin II, which breaks down the oxygen-carrying molecule hemoglobin in human blood cells. Two have teamed up to genetically “dissect” the mechanisms that malarial parasites use in causing disease. The fifth researcher focuses on understanding how *Plasmodium falciparum*, the most dangerous form of the parasite that causes malaria, is able to become rapidly resistant to drugs used to treat the disease. As a revision to this program, in 1998 BWF will provide two levels of support: four-year awards of \$400,000 for established investigators, and two-year “starter grants” of \$100,000 for less experienced investigators, for investigators from outside fields who are reorienting their research, or for feasibility studies and pilot work that will underpin higher-risk projects in malaria.

*Sequencing genetic
blueprint of deadly
malaria parasites*

Three ad hoc initiatives in infectious diseases deserve special mention. The first is an international effort to sequence the genome—the complete set of genetic material—of *Plasmodium falciparum*. Information from this project will translate to a better understanding of the basic biology of the parasite and of the mechanisms of pathogenesis, and it will help in identifying new vaccine and drug targets. Other partners joining BWF in support of this effort are the Wellcome Trust, in the United Kingdom, and, in the United States, the National Institute of Allergy and Infectious Diseases and the Department of Defense. The principal laboratories undertaking the sequencing are the Sanger Center, Stanford University, and the Institute for Genomic Research (TIGR), in collaboration with the Naval Medical Research Institute. Also participating are several other laboratories in the United States, England, and Australia whose work on technology development has been pivotal in the sequencing effort.

A second BWF effort is a partnership with the National Institute for Dental Research to support sequencing of the genome of *Candida albicans*. This organism is a major fungal pathogen of patients whose immune systems are suppressed, including patients with cancer and AIDS, as well as those who have had organ transplants. This project, which focuses on a much smaller genome than that of *Plasmodium*, is under way at Stanford University.

Finally, recognizing the need to provide state-of-the-art training in the molecular analysis of fungal pathogens that infect humans, BWF launched a new training course for advanced graduate and postdoctoral students and independent investigators. The three-week course, which will be offered annually, was first held in August 1997 at the Marine Biological Laboratory, in Woods Hole, Massachusetts. The main areas covered include an introduction to the medically important fungi, molecular manipulation and analysis of these fungi, host-fungal interactions, and the application of molecular methods to analysis of fungal disease.

Therapeutic Sciences

Spanning the spectrum from basic studies to patient-oriented research, BWF's programs in the therapeutic sciences are intended to bring new thinking and novel approaches to pharmacology, toxicology, and experimental therapeutics. The Fund encourages the broadest definition of pharmacology and toxicology, in particular—not so much in terms of how these disciplines traditionally are recognized, but by how the latest research advances might be brought to bear upon them. BWF made 13 scholar awards and new investigators awards in these areas. One scholar, for example, is exploring a new technique called “molecular farming” to produce biopharmaceuticals to help prevent insulin-dependent diabetes, and one new investigator is genetically engineering the surface of cancer cells in hope of rendering them selectively vulnerable to chemotherapy.

These programs are undergoing considerable change, as BWF evaluates its activities and makes adjustments to best match current scientific and funding needs. Beginning in 1998, the 17-year-old Toxicology Scholar Award for mid-career investigators will be redirected to a new investigator award program, focusing exclusively on scientists at the beginning of their faculty careers. In addition, the toxicology and pharmacology awards are being brought under a single umbrella, in recognition of the close relationship between these disciplines.

The former experimental therapeutics program has been transformed into a more clinically oriented program—Clinical Scientist Awards in Translational Research. The idea for this new program grew out of the work of a special National Institutes of Health Director's Panel on Clinical Research. Commissioned in 1995, this panel studied the national status of clinical research and recommended ways by which clinical research might be stabilized and improved. Panel chair Dr. David Nathan wrote: “The deficiency in physician-investigators has serious implications as to whether a sufficient cadre of clinical scientists will be available in the future to perform the applied research that will translate advances in the basic biomedical sciences to the relief of human suffering and disability.” One of the panel's specific recommendations was to develop awards for young and mid-career investigators in clinical research to promote and stabilize careers in the field. BWF has accepted the challenge. The Fund's new program offers five-year awards of \$750,000 to clinical scientists at the mid-faculty level who have “one foot in the laboratory and the other in the patient's room—and are comfortable moving back and forth.” The awards are intended to encourage career development and acknowledge the current pressures that many young physicians feel as a result of their shouldering increased clinical responsibilities, the loss of cross-subsidies from medical schools due to managed care and tighter cost controls, and a shrinking patient population due to competition for health-care dollars.

Promoting new thinking and novel research approaches

Translating basic science knowledge into clinical use

*Key questions
remain in
understudied field*

Reproductive Science

BWF considers reproductive science to be seriously understudied, and the Fund has chosen to allocate some of its Career Awards in the Biomedical Sciences to postdoctoral researchers working in this field. In 1997, BWF made its first career awards targeted to reproductive science, with awards going to three investigators. In addition, the Fund supports an annual postdoctoral research fellowship in obstetrics and gynecology, which is administered in partnership with the American Association of Obstetricians and Gynecologists Foundation. BWF also launched its participation in the Reproductive Scientist Development Program (RSDP), a consortium supported by the National Institute of Child Health and Human Development, professional societies, and foundations. RSDP provides grants to obstetrician-gynecologists working in the basic reproductive sciences to help them bridge the postdoctoral years and initial faculty appointment.

Complementing these competitive award programs, BWF played a leadership role in developing and supporting a new training course, *Frontiers in Reproduction*, that will be held in spring 1998 at the Marine Biological Laboratory. This will be a hands-on, laboratory-based, career-development course designed to teach an international group of participants state-of-the-art research technologies and to help them develop molecular and cellular research concepts and applications in reproductive science.

Through these various routes of fostering the development and training of physicians and scientists pursuing careers in reproductive science—which together represent an investment in 1997 of nearly \$2 million—BWF hopes to help answer some of the many key questions that mark this field. Fundamental gaps remain, for example, in our knowledge of such basic areas as the immunology of pregnancy, causes of premature birth, and endocrine regulation.

Interfaces between the Physical and Biological Sciences

Convinced that the physical, chemical, and computational sciences have great potential to advance the biomedical field, BWF made four inaugural awards totaling \$10 million in its “Interfaces” program. The awards are intended to fill the gap left by federal funding efforts that are predominantly built around specific disciplines, and the Fund believes this is the only private program devoted to bridging the physical and biological sciences through institutional interdisciplinary training grants. Two awards went to individual institutions: California Institute of Technology and Rockefeller University. Two awards went to joint ventures: the La Jolla Interfaces in Science Training Program (a consortium composed of the University of California-San Diego, the Scripps Research Institute, the Salk Institute for Biological Studies, and the San Diego Supercomputing Center); and the Program in Mathematics and Molecular Biology (a national research and training consortium that has 17 participating laboratories representing 12 institutions), which is administered by Florida State University.

California Institute of Technology is establishing a new program for interdisciplinary graduate and postdoctoral training in an emerging field called “computational molecular biology.” This field involves the integrated application of both experimental and theoretical methods—an approach more typically employed in the physical sciences—to complex problems in molecular biology. Caltech historically has fostered interactions that cross traditional disciplinary boundaries, and BWF’s

*Studies at scientific
boundaries hold
potential for
biomedical
advances*

award will help to formalize, nurture, and expand upon a set of excellent collaborative research and training projects now under way. The program primarily will focus on studies of biological structures at the molecular, cellular, and tissue levels; on studies of regulatory networks of interacting proteins and genes; and on developing and applying innovative instrumentation and “informatics,” or computer programs to manage extremely large amounts of information. BWF’s award will support two postdoctoral scholars and two senior postdoctoral scholars, five predoctoral research assistants, and four exceptional undergraduate students who will participate in interdisciplinary research during the summer. There also will be modest “venture capital” grants for radically innovative cross-disciplinary research at the professorial level, as well as a coordinated series of seminars, lectures, and workshops.

Rockefeller University is creating a new interdisciplinary graduate and postdoctoral training program specifically designed to attract gifted chemists and physicists to the biological sciences. The program will build on the institution’s recent efforts to promote interdisciplinary research. For example, Rockefeller has developed 12 new laboratories in which scientists focus on key problems at the interface between the physical and biological sciences, and it has established two complementary academic centers—the Center for Studies in Physics and Biology and the Center for Biochemistry and Structural Biology—to address issues at the interdisciplinary frontier. BWF’s award will support, each year, three to five graduate fellows and three or four postdoctoral fellows for two years of training, and one advanced postdoctoral fellow in chemistry for three years of training. It also will provide research funds for the fellows. With access to comprehensive, state-of-the-art facilities and training opportunities, participants will gain the intellectual and technical background needed to devise new scientific refinements and applications capable of yielding novel biological insights.

The LaJolla Interfaces in Science Training Program will provide new opportunities for Ph.D. and postdoctoral students from traditional quantitative disciplines (chemistry, physics, mathematics, computer science, and engineering) to broaden their educational experiences through an interdisciplinary approach to “quantitative” biology, in which theoretical and mathematical concepts are applied to biological questions. The four participating institutions already have a record of independent interdisciplinary projects, but the projects have been implemented on an ad hoc basis with little coordination. BWF’s award is enabling them to expand, coordinate, and sustain interdisciplinary training under formal institutional mechanisms. The award will support an average of eight predoctoral fellows and six postdoctoral fellows each year. Other activities will include workshops, seminars, summer programs, and annual retreats to build and extend trainees’ exposure to the interfaces between sciences.

The Program in Mathematics and Molecular Biology is a multi-university, interdisciplinary national research and training consortium that has existed since 1988, with primary funding from the National Science Foundation. The program’s overall goal is to foster the development and expansion of mathematical and computational tools for the design and analysis of experiments on key questions in molecular biology. BWF’s award will enable the program to enroll 12 to 14 predoctoral and postdoctoral fellows annually—roughly double the current enrollment. The fellows will train for one or two years in the laboratories of the participating institutions, an experience that is expected to help students and scientists from mathematics and biology learn about both disciplines and their applications to common problems. The program also will include such activities as annual two-week “short courses” and workshops,

*Bridging the
physical and
biological
sciences through
institutional
training grants*

*Departmental
walls block
interdisciplinary
interests*

*Strong research
enterprise needs
strong educational
foundation*

as well as the development of a public home page on the World Wide Web to publicize activities and events relevant to others interested in learning about work at the interface between mathematics and molecular biology.

BWF's Board of Directors was so impressed by the response to the first round of competition—as well as by the considerable enthusiasm for the program throughout the scientific community—that the Fund decided to offer a second round of awards in 1998. From this experience, BWF hopes to learn more about how best to promote interdisciplinary training and encourage institutions to break down the usual departmental walls that too often block students from pursuing their interests across disparate disciplines. The job is not expected to be easy—the sciences themselves use different languages and methodological paradigms. But BWF sees great rewards in recruiting and training young investigators whose strong backgrounds in physics, chemistry, or mathematics enable them to bring different approaches and new ideas to the task of solving interesting medical problems.

Science Education

A strong research enterprise rests squarely on strong educational programs to interest talented students in science and help them gain the skills necessary to pursue their ambitions. Capturing the attention of middle school and high school students and conveying the excitement of the discovery process through hands-on, experiential activities is the goal of BWF's Student Science Enrichment Program (SSEP). The Fund made eight new awards, bringing the total number of awards to 20 since the program began in 1996. Currently limited to BWF's home state, SSEP provides a variety of science education experiences to several thousand secondary students across North Carolina. The program also casts a wide net for students too often left off the science track: 62 percent of the students being served are female and 43 percent are minorities.

Museums, schools, community organizations, and colleges and universities have joined together in a variety of partnerships to provide students with access to resources not readily available to most secondary school students. As but one example of the newest SSEP projects, more than 300 students in the Durham area are learning basic and advanced skills in computing and communications technologies by participating in inquiry-based activities that encourage collaboration, exploration, experimentation, and discovery. How have students received SSEP? Based on survey results, it is clear that most enjoyed participating in hands-on exploration. More than three-quarters of the students said they liked the program, and two-thirds said they would recommend the program to a friend. Perhaps as highest praise, 82 percent would themselves participate again if given the chance!

At the advanced level, BWF's two visiting professorship programs in the basic medical sciences and in the microbiological sciences this year enabled more than 30 colleges and universities to bring in distinguished scientists to teach and interact with faculty and students. These week-long visits are reported to yield lasting benefits, as participants have an opportunity to learn firsthand from leading experts in the disciplines targeted for attention. Beginning in 1998, Canadian four-year, degree-granting institutions also will be eligible to participate in both professorship programs, and BWF has teamed up with the Canadian Federation of Biological Societies to administer the basic medical sciences program in that country.

In addition to its competitive programs, BWF supported two particularly noteworthy North Carolina-based ad hoc grants to improve science education. In the first project, the Fund continued its support, begun in 1996, of the Education Future Center. Led by the North Carolina School of Science and Mathematics, along with partnering organizations, this effort is intended to promote better utilization of resources and develop innovative adaptations of technology for teaching and learning—all geared toward improving the “interconnectedness” among the various participants in the educational enterprise. As a key component, the center is connecting electronically many of the state’s elementary, middle, and secondary schools; colleges and universities; governmental agencies; corporations; and other groups. As part of this effort, seven “cyber campuses,” each located in one of the state’s “economic development zones,” are being established to serve as sites for receiving an array of educational services. The second ad hoc grant was made to support the Institute for Educational Policy Makers, a new group—the first of its kind in the nation—devoted to enhancing the educational policymaking capacity of elected state and local officials. The institute’s mission is to provide, through a series of meetings and other activities, North Carolina policy makers and the media with timely, factual, and unbiased information on education, and particularly information related to science and technology. The outcome, it is hoped, will be informed decision-making in these matters that are so vitally important to the state and its citizens.

*Providing tools
for improving
educational
policymaking*

Environment for Science

BWF strives to fulfill a role in the science community that goes beyond its competitive award programs. The Fund’s grantmaking is targeted largely toward the career development of individual scientists and to “undervalued” research areas, but beyond this is recognition that BWF can play a crucial role in convening, catalyzing, and connecting with others to improve the environment for science. Indeed, this past year BWF supported more than two dozen meetings and participated in a number of others. The Fund also worked with three other concerned private funders—the Pew Charitable Trusts, the Howard Hughes Medical Institute, and the American Cancer Society—to conceive and plan a special meeting on philanthropy in the medical sciences, to be held in February 1998. The meeting is entitled “Market Forces, the Information Age, and Health Research: Implications for Foundations, Voluntary Health and Medical Research Organizations.” BWF sees this as an important way for private funders to better understand the forces affecting the health research enterprise, to explore strategies to help stabilize and strengthen this enterprise, and to build a community of funders who are better informed and committed to working more collaboratively in pursuing those opportunities.

*Strengthening
the research
enterprise*

* * *

So comes the end of this trip report—Dr. Fuller’s advice being heeded, with difficulty born of pride—on BWF’s journey to support research and other activities to improve human health. But even with this brief pause to reflect upon BWF’s progress, everyone at the Burroughs Wellcome Fund realizes that our destination lies ahead and remains motivated by the knowledge that there are still many steps to be taken.

Career Development: Meeting the Family

Seeking a faculty appointment is hard enough, but how do I negotiate offers to make sure an institution provides what I need to become an independent investigator?

I'm well trained to be a research scientist, but I have almost no idea of how to manage a laboratory, which is turning out to be a big part of my job.

I found it really valuable to have a good mentor during my postdoctoral training, but now I have to become a mentor to others...help!

Everybody talks about academic-industrial collaborations, but how can someone at my academic level begin to make connections with appropriate people in industry?

*Investing in
"human capital"
offers great
leverage*

Refrains like these are commonplace among scientists who are early in their careers, striving to make the critical transition from life as a postdoctoral researcher to success as an independent investigator. Such issues were at the center of discussions during a recent Burroughs Wellcome Fund conference that brought together—for the first time ever—the awardees in BWF's major career development programs. The two-day meeting, held in July 1997 in Montebello, Quebec, was attended by 51 of the 52 current Career Award in the Biomedical Sciences recipients and by 7 of the 11 Hitchings-Elion Fellowship recipients who are in the third and final year of their award. A number of talented postdoctoral scientists supported by the Medical Research Council of Canada (MRC) also participated in the meeting.

Fostering the development and productivity of outstanding biomedical scientists early in their careers is one of BWF's major goals. The Fund believes that investing in "human capital" offers the greatest leverage for improving the well-being of the research enterprise, which will in turn lead to significant advances in human health and well-being. Recent years have made this mission especially important. Federal support for biomedical research and training has grown slowly, although there are some signs that the funding picture may begin to improve. In response to this budget tightening, many academic institutions are retrenching, reducing their number of tenure-track faculty appointments. Yet at the same time, universities have increased their annual output of Ph.D. scientists. Confusing? Well, imagine being a postdoc facing the task of navigating these murky waters in search of a fruitful faculty career in biomedical research. BWF hopes to help such scientists in their journeys—both with financial support and with the occasional institutional helping hand.

The overarching goal of the Career Awards Meeting was to highlight the work of BWF's awardees in order to promote scientific collaboration. Toward this end, the meeting was structured to give the awardees opportunity to meet one another and interact with the members of the Fund's Board of Directors, advisory committees, and program staff; to assist the awardees in developing a peer network and in exchanging scientific information; and to provide the awardees with career development and scientific information that will help them make the most of their awards. To help catalyze interactions, informality was the order of the day. Participants were encouraged to be comfortable, have a good time, and enjoy the various opportunities for getting to know one another in an atmosphere of friendly collegiality.

BWF considers its awardees to be “part of the family,” and this meeting helped everyone become more than mere names on an unfamiliar family tree. Dr. Samuel Katz, chair of BWF’s board, noted his “pleasure in being able to have one-on-one discussions with some really sparkling awardees whom I really only knew about on paper.” Dr. Louis Muglia, a 1996 career award recipient, enjoyed “getting to meet the other awardees, who are roughly at the same career stage as I am and who are struggling with many of the issues that I face in my laboratory and in my career.” Dr. Frank Huennekens, a member of the Hitchings-Elion Fellowships advisory committee, said the experience “filled me with pride, meeting the awardees and seeing how well they are doing—and, in a selfish sense, seeing how well the committee had selected awardees from their written applications and brief interviews!”

*Talking with
some “really
sparkling”
awardees*

Highlights of the Meeting

The meeting featured, among other activities, several “hands-on” activities, including poster sessions where awardees presented their research and roundtables where awardees and other participants shared the scientific and personal experiences they’ve encountered. There was a grant-writing workshop in which awardees learned how to prepare a good application—the instructor’s motto: “The best writing can’t turn a bad idea into a good grant proposal, but bad writing can turn a good idea into an unfunded proposal.” In addition, there were presentations by distinguished scientists on several scientific and career-development topics. Some of the highlights will, perhaps, provide at least a flavor of the experience.

Dr. Bruce Fuchs, acting director of the Office of Science Education at the National Institutes of Health, spoke on “Communicating Science to the Public.” Always important and often overlooked, this task is gaining increasing urgency, he said, in an age of accountability in which the public has a vested interest in funding priorities. This job is made easy, on the one hand, because the public widely expresses great interest in science—and especially medical science. But it is made hard, on the other hand, because of the language gap that often exists between the laboratory and the living room. Dr. Fuchs advice: “Tell the story about your research so your grandmother can understand it.”

*Reaching out
to the public*

Dr. Janet Rowley, Blum-Riese Distinguished Service Professor of Medicine at the University of Chicago and a “founding member” of BWF’s career awards advisory committee, presented a captivating synopsis of her life’s work. Her career, it can be said, serves as a role model in several ways: as a model of the lessons to be gained when scientists bridge the boundaries between disciplines, as a model of how clinician-scientists can “translate” between the bench and bedside to improve patient care, and as a model for women pushing the frontiers of science. Dr. Rowley has been instrumental in demonstrating the role that abnormalities in human chromosomes, the body’s fundamental genetic instructions, play in cancer. Through years in the laboratory and in the clinic, she has pieced together a cohesive picture of how patterns of chromosomal abnormalities can cause cancer and how this knowledge might be exploited for treatment.

Dr. Henry Friesen, president of the Medical Research Council of Canada and a member of BWF’s board, surveyed “Health Science in Canada.” His country, he said, produces 4 percent of the world’s scientific output in terms of research publications, and Canadian researchers consistently are in the top 10 rankings in the Scientific

*Seeking and
negotiating
faculty positions*

Citation Index. In health research, most federal support is channeled through the MRC, and its \$238 million in government funds go to support some 10,000 scientists and technicians at universities, research institutes, and teaching hospitals across the country. While Canada has a rich tradition in health science, however, recent budget cuts threaten the future. Dr. Friesen says that by 1998, the MRC's budget will have declined to the support level of the early 1980s.

Issues Facing Young Scientists Today

The roundtable discussions on "Issues Facing Young Scientists Today" proved lively, and participants identified a number of problems, as well as opportunities, that are commonplace in the lives of advancing scientists. One major issue is how to seek and negotiate a faculty position that will lead to becoming a successful independent investigator. The awardees—some at the advanced postdoctoral level and some at the beginning faculty level—shared their concerns and experiences about which techniques work, where to go for information, what to look for in start-up packages, and numerous other matters. For their part, BWF board and advisory committee members, as prominent senior-level scientists, shared their accumulated knowledge about these issues. They also outlined what institutions look for, what new scientists should look for, and how to arrange the best fit. One message to awardees, for example, was to "speak out and ask lots of questions" during interviews for a faculty position: "I'm always surprised by how often interviewees simply respond to questions shot at them," according to Dr. Huennekens. "This is their best chance to shine, as well as their chance to learn whether the position offers them what they really want."

Laboratory management emerged as a pressing concern. After years (!) spent working in someone else's laboratory, many postdocs find themselves poorly prepared to run their own labs. Most institutions and advisers fail to provide their postdocs with such experience—indeed, in the crunch of "doing science," they usually don't even tell postdocs that such responsibility awaits. How do you manage personnel and financial resources? How do you buy or find ways to share the right equipment? How do you recruit good graduate and postdoctoral students? Myriad questions face new faculty members as they learn, usually by the seat of their pants, the ins and outs of lab management.

*When "mentees"
become mentors*

Change also marks the issue of mentoring. Most postdocs report that having a good mentor—one who is both solid scientist and patient adviser—is invaluable. Early on, postdocs face the challenge of finding the right person, or switching mentors if things aren't working out. When the "mentee" moves on to a faculty position, other concerns arise. How to divide the intellectual property developed by postdocs in their adviser's lab? How to establish intellectual independence from the mentor (which can be especially thorny if the fledgling faculty member remains at the same institution)? How to cope with "independence anxiety"? Perhaps the biggest change, however, centers on the necessary role reversal that takes place when new faculty members begin to become mentors to their own postdocs. The best advice? Remember what worked, remember what didn't, then add your own personality.

Finding support for research faces scientists at all levels, and scientists early in their careers, because they lack established track records, often have added difficulty in getting federal grants. BWF's career awards are intended to help recipients gain the experience needed to compete successfully. Still, current wisdom says scientists are

well advised to cast their nets beyond federal coffers, and, for some, industry may be attractive. Companies now account for roughly half of the approximately \$36 billion spent in the United States for biomedical research. But awardees at the meeting expressed uncertainty about what kinds of projects might attract industrial support and how to approach industrial investigators to explore collaborative research, among other concerns. Helpful discussions ensued. One informed suggestion was offered by Dr. Gertrude Elion, a BWF board member who has worked in industry for nearly 50 years and who received a Nobel Prize for her contributions: "Ask. Search the literature to see who in industry is publishing in your field, scout around at meetings, make some phone calls to likely companies. Then offer some proposals, open some doors—we're certainly interested in hearing what young academic scientists have up their sleeves."

The meeting also was intended to provide BWF with feedback about the structure and performance of its award programs. The marks, thank you, were good. The scientists like the flexibility of the awards, which enable them to pursue innovative research and tailor their institutional arrangements to meet individual needs. And they like the Fund's personal touch. "It's clear that BWF is committed to its awardees," according to Dr. Inke Nathke, a 1995 career award recipient. "I know I can call on Fund staff whenever I need help sorting something out with my university. With other funders, it seems like you are more on your own."

*Opportunity
for feedback*

So, onward. BWF has under way or is planning a number of activities to foster career development. The Fund will convene other "family reunions." Career-development meetings are planned for every other year. In 1998, BWF will convene—another first—the recipients of its new investigator awards. Since these scientists are further up the academic ladder, information gained will provide additional data points on career concerns and opportunities.

Among other activities, BWF is supporting *Science's Next Wave*, a website geared to young scientists and operated by the American Association for the Advancement of Science, to plan an interactive forum dealing with laboratory management. The Fund also is collaborating with the Howard Hughes Medical Institute (HHMI) to place on the World Wide Web an expanded version of BWF's "Career Development Resource Guide," an annotated bibliography, produced for the Career Awards Meeting, that summarizes a selection of recent articles addressing issues facing scientists early in their careers. The guide will be housed on a new website called *GrantsNet*, which HHMI is funding *Science's Next Wave* to construct. Set to debut in spring 1998, the site will offer "one-stop shopping" for predoctoral and postdoctoral researchers and physician-scientists, as well as junior faculty members, to obtain detailed information on every available funding program. In addition, BWF provides grant support for several organizations, such as the Commission on Professionals in Science and Technology, that conduct a variety of projects concerned with ensuring a healthy research enterprise. And for brevity's sake, a final mention: the Fund is seeking additional new members from industry to join its advisory committees, to strengthen input from that critical sector of the research community.

*Ongoing efforts
to foster career
development*

BWF believes that talented young biomedical scientists, well-trained and free to pursue fundamental research, are one of the nation's most important assets. The Fund is committed to cultivating these explorers, who promise to advance the well-being of us all. After all, it is only appropriate that families offer a helping hand.

Finance



Scott G. Schoedler
*Vice President,
Finance*

The Burroughs Wellcome Fund's investments totaled \$595.8 million at August 31, 1997, the end of BWF's fiscal year. The Fund's primary financial goal is to pursue an investment strategy that will support annual spending needs and maintain a constant real level of assets over the long term. To achieve this goal, substantially all of BWF's investments are placed in asset classes that invest in the U.S. and international capital markets. Hence, fluctuations in the Fund's investment results will be due largely to variability in capital market returns.

BWF's investment policies are developed with the recommendations and review of the Investment Committee, which is appointed by and reports to the Fund's Board of Directors. The committee's five voting members include two representatives of the board and three representatives from outside the Fund. The board's chair, BWF's president, and BWF's vice president for finance also serve on the committee as nonvoting members. Stephen D. Corman, BWF's treasurer, and Mary Ellen Avery, M.D., currently represent the board as voting members, with Mr. Corman serving as committee chair. The committee's external members are J. Thomas Allen, president of Advanced Investment Management; W. Curtis Livingston, chair and chief executive officer of Western Asset Management; and Ronald Frashure, executive vice president of Acadian Asset Management.

As part of its investment strategy, BWF has established "allocation targets"—percentages of the Fund's total assets to be invested in particular asset classes. Investment managers hired by the Fund then pursue more focused mandates within each sector. At August 31, 1997, BWF's asset mix and market values were:

- U.S. equity assets had a market value of \$307.7 million; the sector's target allocation was 53 percent, and actual holdings stood at 51.6 percent.
- International equity assets had a market value of \$144.5 million; the sector's target allocation was 23 percent, and actual holdings stood at 24.3 percent.
- U.S. fixed income assets (bonds) had a market value of \$126.5 million; the sector's target allocation was 21 percent, and actual holdings stood at 21.2 percent.
- Cash equivalent assets had a market value of \$17.1 million; the sector's target allocation was 3 percent, and actual holdings stood at 2.9 percent.

The total market value of the Fund's investments increased in fiscal 1997 by \$173.8 million, or 41 percent, from the market value of \$422 million at the end of fiscal 1996. Of this increase, \$80 million was due to the fifth installment, received in January 1997, of the Wellcome Trust's five-year gift to the Fund. The remaining increase of \$93.8 million resulted from investment returns (after cash outflows) during the year.

The Fund achieved a 26.5 percent return on its investments for fiscal 1997, which followed a 12.4 percent return for fiscal 1996 and a 15.9 percent return for fiscal 1995. This year's strong performance was due primarily to the rising U.S. equity

*BWF's asset mix
and market values*

market, which, although more volatile in early 1997 than in the prior two years, continued to provide excellent returns to investors. Hence, as was the case in both fiscal 1995 and 1996, the Fund's U.S. equity managers led the way in 1997 with a 36.8 percent return. The international equity sector produced the year's next best performance with a 19.1 percent return. U.S. bonds posted a return of 11 percent, much improved over fiscal 1996. In relative terms, comparing the Fund's results with industry-accepted performance benchmarks, the results were mixed. The international equity sector surpassed its benchmark (the Europe-Australia-Far East Index) by a large 9.7 percent, and the U.S. bond sector outperformed its benchmark (the Lehman Aggregate Bond Index) by 0.9 percent, while the U.S. equity sector underperformed its benchmark (a blend of the Standard and Poor's 500 and the Frank Russell 2000 indices) by 1.3 percent.

BWF employs nine investment managers. In the U.S. equity sector, the managers are Independence Investment Associates; Brandywine Asset Management; Cohen, Klingenstein and Marks; Kennedy Capital Management; and Scudder, Stevens and Clark. Capital Guardian Trust Company and Barclays Global Investors are the international equity managers. Pacific Investment Management Company and Smith Breeden Associates are the U.S. bond managers. Both bond managers began operations for BWF in April 1997, as a result of a restructuring of the Fund's fixed income sector.

The Fund reviews its strategic investment policy every three years, and the Investment Committee conducted its most recent review in late 1996. This review led to an increase in the allocation of assets to international equities and to slight decreases in the commitment of assets to U.S. equity and fixed income assets. The new allocation policy was implemented in January 1997, concurrent with receipt of the final installment from the Wellcome Trust. In addition, the committee decided to pursue the allocation of up to 5 percent of the Fund's total assets to alternative investments, which are defined as investments that do not fall into any of the above asset classes. As of August 31, 1997, however, no alternative investments had been made.

*Strong investment
returns third year
in a row*

*Regular review of
financial strategies*

Financial Statements and Additional Information

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Report of Independent Accountants

To the Board of Directors of
The Burroughs Wellcome Fund

In our opinion, the accompanying statement of financial position and the related statements of activities and of cash flows present fairly, in all material respects, the financial position of The Burroughs Wellcome Fund (the "Fund") at August 31, 1997 and 1996, and the changes in its net assets and its cash flows for the years then ended in conformity with generally accepted accounting principles. These financial statements are the responsibility of the Fund's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with generally accepted auditing standards which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed above.

Our 1997 audit was conducted for the purpose of forming an opinion on the basic financial statements taken as a whole. The information presented in Schedules I and II is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Price Waterhouse LLP

Price Waterhouse LLP
Raleigh, North Carolina
October 10, 1997

STATEMENT OF FINANCIAL POSITION

August 31, 1997 and 1996

(All dollar amounts presented in thousands)

	1997	1996
ASSETS		
Cash and cash equivalents	\$ 39,196	\$ 16,012
Marketable securities (Note 6)	571,452	352,949
Transactions receivable, net	-	52,336
Accrued interest and dividends receivable	1,135	914
Contributions receivable (Note 5)	-	78,535
Other assets	15	18
Construction-in-progress (Note 2)	473	51
Property and equipment, net (accumulated depreciation of \$34 in 1997 and \$25 in 1996)	49	58
Total assets	<u>\$ 612,320</u>	<u>\$ 500,873</u>
LIABILITIES AND NET ASSETS		
Transactions payable, net	\$ 15,661	\$ -
Accounts payable and other liabilities	1,200	562
Unpaid awards (Note 4)	40,043	27,894
Federal excise taxes payable (Note 3)	99	-
Deferred federal excise taxes (Note 3)	1,526	393
Total liabilities	58,529	28,849
Unrestricted net assets	553,791	393,489
Temporarily restricted net assets	-	78,535
Total net assets	<u>553,791</u>	<u>472,024</u>
Total liabilities and net assets	<u>\$ 612,320</u>	<u>\$ 500,873</u>

The accompanying notes are an integral part of these financial statements

STATEMENT OF ACTIVITIES

Years Ended August 31, 1997 and 1996

(All dollar amounts presented in thousands)

	Unrestricted	1997 Temporarily Restricted	Total	Unrestricted	1996 Temporarily Restricted	Total
Revenues:						
Contributions	\$ -	\$ 3,157	\$ 3,157	\$ -	\$ 5,700	\$ 5,700
Interest and dividends, less investment expenses of \$2,832 in 1997 and \$2,236 in 1996	12,884	-	12,884	10,435	-	10,435
Net realized gain on sales of marketable securities	48,024	-	48,024	41,035	-	41,035
Net assets released from restrictions (Note 1)	81,692	(81,692)	-	80,000	(80,000)	-
Total revenues	<u>142,600</u>	<u>(78,535)</u>	<u>64,065</u>	<u>131,470</u>	<u>(74,300)</u>	<u>57,170</u>
Expenses:						
Program services	33,409	-	33,409	25,685	-	25,685
Management and general	<u>4,401</u>	<u>-</u>	<u>4,401</u>	<u>3,585</u>	<u>-</u>	<u>3,585</u>
Total expenses	<u>37,810</u>	<u>-</u>	<u>37,810</u>	<u>29,270</u>	<u>-</u>	<u>29,270</u>
Increase (decrease) in unrealized appreciation of marketable securities, net of provision (credit) for deferred federal excise taxes of \$1,133 in 1997 and (\$216) in 1996 (Notes 3 and 6)	<u>55,512</u>	<u>-</u>	<u>55,512</u>	<u>(10,568)</u>	<u>-</u>	<u>(10,568)</u>
Change in net assets	160,302	(78,535)	81,767	91,632	(74,300)	17,332
Net assets at beginning of year	<u>393,489</u>	<u>78,535</u>	<u>472,024</u>	<u>301,857</u>	<u>152,835</u>	<u>454,692</u>
Net assets at end of year	<u>\$ 553,791</u>	<u>\$ -</u>	<u>\$ 553,791</u>	<u>\$ 393,489</u>	<u>\$ 78,535</u>	<u>\$ 472,024</u>

The accompanying notes are an integral part of these financial statements

STATEMENT OF CASH FLOWS

Years Ended August 31, 1997 and 1996

(All dollar amounts presented in thousands)

	1997	1996
Cash flows from operating activities:-		
Change in net assets	\$ 81,767	\$ 17,332
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Depreciation	9	9
Net realized gain on sales of marketable securities	(48,024)	(41,035)
(Increase) decrease in unrealized appreciation of marketable securities	(56,645)	10,785
Decrease in contributions receivable	78,535	74,300
Change in transactions receivable/payable, net	67,997	(51,655)
Increase in accrued interest and dividends receivable	(221)	(51)
Decrease (increase) in other assets	3	(7)
Increase in accounts payable and other liabilities	638	218
Increase in unpaid awards	12,149	11,922
Increase in federal excise taxes payable	99	-
Increase (decrease) in deferred federal excise taxes	1,133	(216)
Net cash provided by operating activities	<u>137,440</u>	<u>21,602</u>
Cash flows from investing activities:		
Purchases of marketable securities	(1,558,859)	(712,965)
Proceeds from sales of marketable securities	1,445,025	697,945
Increase in construction-in-progress	(422)	(51)
Net cash used by investing activities	<u>(114,256)</u>	<u>(15,071)</u>
Net increase in cash and cash equivalents	23,184	6,531
Cash and cash equivalents at beginning of year	<u>16,012</u>	<u>9,481</u>
Cash and cash equivalents at end of year	<u>\$ 39,196</u>	<u>\$ 16,012</u>
Supplemental disclosure of cash flow information:		
Cash paid during the year for federal excise taxes	<u>\$ 1,001</u>	<u>\$ 1,168</u>

The accompanying notes are an integral part of these financial statements

NOTES TO FINANCIAL STATEMENTS

Years Ended August 31, 1997 and 1996

(All dollar amounts presented in thousands)

1. Organization and Summary of Significant Accounting Policies

The Burroughs Wellcome Fund (the "Fund") is an independent private foundation established to advance the medical sciences by supporting research and other scientific and educational activities.

Cash equivalents

Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash and have a maturity of three months or less at the time of purchase.

Forward currency contracts

The Fund enters into financial instruments with off-balance sheet risk in the normal course of its investment activity, primarily forward contracts, to reduce the Fund's exposure to fluctuations in foreign currency exchange rates. These contracts are for delivery of a specified amount of foreign currency at a fixed future date and a fixed exchange rate. Gains or losses on these contracts occur due to fluctuations in exchange rates between the commencement date and the settlement date. Gains and losses on settled contracts are included within "net realized gains on sales of marketable securities," and the market value of open contracts is included within "increase (decrease) in unrealized appreciation of marketable securities" in the accompanying statement of activities. It is the Fund's policy to utilize forward contracts to reduce foreign exchange rate risk when foreign-based investment purchases or sales are anticipated.

The contract amount of these forward contracts totaled \$7,620 and \$1,212 at August 31, 1997 and 1996, respectively. Realized gains on forward currency contracts totaled \$659 and \$21 in 1997 and 1996, respectively. The market value of open contracts at August 31, 1997 and 1996 was \$281 and \$182, respectively. The market value is recorded as an asset in the Fund's financial statements. The average fair value of open contracts totaled \$164 and \$139 for the years ending August 31, 1997 and 1996, respectively.

Marketable securities

Marketable securities are carried at market value based on quoted prices. Gains and losses from sales of securities are determined on an average cost basis and are recognized when realized. Changes in the market value of securities are reflected as unrealized appreciation or depreciation in the accompanying statement of activities. The Fund has nine investment advisors which manage its portfolio of marketable securities. The Fund's management critically evaluates investment advisor performance and compliance with established diversification and investment policies.

Transactions receivable and transactions payable, net

These amounts represent the net receivable or payable resulting from investment transactions with trade dates prior to August 31 and settlement dates subsequent to August 31.

Contributions

Contributions are recorded as assets and revenue at the time pledged at their estimated realizable value and are discounted to present value using a risk-free discount rate. Conditional contributions are recognized when the conditions on which they depend are substantially met. Contribution revenue represents changes in the fair value of contributions receivable from The Wellcome Trust and contributions pledged.

Property and equipment

Property and equipment are depreciated over estimated useful lives ranging from four to fifteen years using the straight-line method.

Awards granted

Grants are expensed at their fair value in the year in which the award is granted, although the grant may be payable over several years. Grants payable over several years are expensed at the present value of their estimated future cash flows.

Temporarily restricted net assets

Temporarily restricted net assets represent the fair value of contributions receivable from The Wellcome Trust. These net assets become unrestricted when the respective installment from The Wellcome Trust is due to be received by the Fund or when the restriction associated with the contribution is accomplished.

Functional allocation of expenses

Costs of the Fund's operations and activities have been summarized on a functional basis in the statement of activities.

Estimated fair value of financial instruments

Financial instruments include cash and cash equivalents, marketable securities, accrued interest and dividends receivable, contributions receivable, other assets, accounts payable and other liabilities, and unpaid awards. All financial instruments are reported at their fair value. The carrying value of accrued interest and dividends receivable, contributions receivable, other assets, accounts payable and other liabilities, and unpaid awards approximates fair value based upon the timing of future expected cash flows. Fair market value of marketable securities is determined based upon the latest quoted sales price for such securities as of the balance sheet date.

Reclassifications

Certain amounts in the 1996 financial statements have been reclassified to conform to the 1997 basis of presentation.

Use of estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

2. Construction-in-progress

Architectural fees paid by the Fund have been capitalized in association with construction of a new facility. The total anticipated cost of the new facility is approximately \$10,000.

3. Federal Excise Taxes

The Fund is exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. However, since the Fund meets the definition of a private foundation under the Internal Revenue Code, it is subject to federal excise tax on its annual net investment income. Deferred federal excise taxes represent the tax liability on unrealized appreciation of marketable securities.

4. Unpaid Awards

The Fund has unpaid awards of \$40,043 as of August 31, 1997. The expected future liability to the Fund has been calculated based on discount rates ranging from 5.55% to 6.70%. These awards are scheduled for payment as follows:

	1997	1996
Payable in less than one year	\$ 15,688	\$ 11,438
Payable in one to five years	<u>30,068</u>	<u>9,436</u>
	45,756	30,874
Unamortized discount	<u>(5,713)</u>	<u>(2,980)</u>
Total	<u>\$ 40,043</u>	<u>\$ 27,894</u>

5. Contributions Receivable

At August 31, contributions receivable from The Wellcome Trust are as follows:

	1997	1996
Receivable in less than one year	\$ -	\$ 80,000
Unamortized discount	<u>-</u>	<u>(1,465)</u>
Total contributions receivable	<u>\$ -</u>	<u>\$ 78,535</u>

The Fund received the fifth of five \$80 million installments from The Wellcome Trust during January 1997. The expected future benefit to the Fund was calculated based on a discount rate of 5.7%.

6. Marketable Securities

The cost and market values of marketable securities at August 31, 1997 and 1996 are as follows:

	1997		1996	
	Cost	Market Value	Cost	Market Value
U.S. and foreign governmental obligations	\$ 98,034	\$ 99,583	\$ 49,262	\$ 48,203
Corporate bonds	22,899	23,164	10,189	9,910
Bond index fund	-	-	40,024	38,715
Common and preferred stocks	237,827	297,761	176,267	195,360
Foreign stocks and foreign equity fund	136,383	150,944	57,543	60,761
	<u>\$ 495,193</u>	<u>\$ 571,452</u>	<u>\$ 333,285</u>	<u>\$ 352,949</u>

7. Commitments

The Fund leases office space under an operating lease with a remaining term of nineteen months. Rental expense for this lease in fiscal 1997 and 1996 was \$141 and \$118, respectively. Net future minimum lease payments under non-cancelable leases as of August 31, 1997 are as follows:

Fiscal Year	
1998	\$ 133
1999	79
Total	<u>\$ 212</u>

8. Employee Benefit and Retirement Plans

The Fund provides medical insurance to all employees working at least thirty hours per week. Coverage extends to each employee's spouse and dependent children, if applicable. The expense for this employee benefit was \$61 and \$52 during fiscal 1997 and 1996, respectively.

The Fund has a defined-contribution retirement plan covering all employees working at least twenty hours per week. Under the terms of the plan, the Fund matches 50% of all employees' contributions up to 6% of the employee's

annual compensation. Employees are 100% vested in employee and employer contributions immediately. The Fund also has a defined-contribution retirement plan funded solely through employer contributions. Under the terms of the plan, the Fund contributes 10% of the employee's annual compensation. This plan covers all employees and vesting in contributions is immediate. The expense for these retirement plans was \$27 and \$94 in fiscal 1997 and \$25 and \$87 in fiscal 1996, respectively.

9. Subsequent Event

In October 1997, the Fund entered into a lease agreement for land on which the Fund's new facility is to be constructed. The land is being leased from a non-profit organization through October 2096.

10. Classification of Expenses

	1997		1996	
	Program Services	Management and General	Program Services	Management and General
Awards granted, net of cancellations and refunds of \$3,404 in 1997 and \$233 in 1996	\$ 33,409	-	\$ 25,685	-
Federal excise taxes	-	\$ 1,100	-	\$ 1,085
Salaries and other employee expenses	-	1,238	-	1,139
Travel and entertainment	-	736	-	430
Maintenance and supplies	-	405	-	263
Honoraria	-	252	-	195
Professional fees	-	253	-	129
Printing and design costs	-	156	-	120
Rent	-	141	-	118
Miscellaneous	-	120	-	106
Total expenses	<u>\$ 33,409</u>	<u>\$ 4,401</u>	<u>\$ 25,685</u>	<u>\$ 3,585</u>

SCHEDULE I

Statement of Award Transactions

Year Ended August 31, 1997

(All dollar amounts presented in thousands)

Unpaid awards, beginning of year	\$ 27,894
Add - Awards granted (Schedule II)	<u>39,546</u>
	67,440
Less - Award payments made	(21,304)
Award cancellations	
(excluding refunds)	(3,360)
Unamortized discount	<u>(2,733)</u>
Unpaid awards, end of year	<u>\$ 40,043</u>

SCHEDULE II

Statement of Awards Granted

Year Ended August 31, 1997

Schedule II information is included in the Grants Index on pages 32-67. The dollar amounts listed in this schedule reflect actual dollars (not dollars in thousands).

Grants Index

PROGRAM SUMMARY

	Approved*	Paid**
CAREER DEVELOPMENT		
Career Awards in the Biomedical Sciences	\$ 10,126,050	\$ 3,004,450
Hitchings-Elion Fellowships	1,574,758	1,342,676
Life Sciences Research Fellowships	333,000	288,000
Wellcome Research Travel Grants	298,954	298,231
Wellcome Trust Travel Grants	13,442	13,442
Other Grants	387,300	173,250
TOTAL CAREER DEVELOPMENT	\$ 12,733,504	\$ 5,120,049
EMERGING INFECTIOUS DISEASES		
Scholar Awards in Molecular Parasitology	\$ 800,000	\$ 820,000
New Investigator Awards in Molecular Parasitology	1,125,000	797,500
New Initiatives in Malaria Research	900,000	350,000
Scholar Awards in Molecular Pathogenic Mycology	800,000	280,000
New Investigator Awards in Molecular Pathogenic Mycology	435,000	137,500
Other Grants	2,988,700	3,292,800
TOTAL EMERGING INFECTIOUS DISEASES	\$ 7,048,700	\$ 5,677,800
THERAPEUTIC SCIENCES		
New Investigator Awards in the Basic Pharmacological Sciences	\$ 1,170,000	\$ 520,000
Scholar Awards in Toxicology	400,000	825,625
New Investigator Awards in Toxicology	780,000	130,000
Scholar Awards in Experimental Therapeutics	800,000	837,500
Other Grants	463,500	270,500
TOTAL THERAPEUTIC SCIENCES	\$ 3,613,500	\$ 2,583,625
REPRODUCTIVE SCIENCE		
Career Awards in the Biomedical Sciences	\$ 1,474,000	\$ 82,500
Obstetrics and Gynecology Research Fellowships	154,000	94,000
Other Grants	362,500	17,500
TOTAL REPRODUCTIVE SCIENCE	\$ 1,990,500	\$ 194,000

	Approved*	Paid**
INTERFACES BETWEEN THE PHYSICAL/CHEMICAL/ COMPUTATIONAL SCIENCES AND THE BIOLOGICAL SCIENCES	\$ 10,000,000	\$ 1,821,500
TOTAL INTERFACES	\$ 10,000,000	\$ 1,821,500
 SCIENCE EDUCATION		
Student Science Enrichment Program	\$ 1,188,100	\$ 852,990
Wellcome Visiting Professorships in the Basic Medical Sciences	148,873	148,873
Wellcome Visiting Professorships in the Microbiological Sciences	25,000	25,000
Other Grants	496,336	729,000
TOTAL SCIENCE EDUCATION	\$ 1,858,309	\$ 1,755,863
 ENVIRONMENT FOR SCIENCE		
General	\$ 2,036,294	\$ 2,008,284
Communications	85,000	415,000
History of Medicine	109,500	1,335,946
Inactive Programs—Active Awardees of Former Programs	70,896	392,581
TOTAL ENVIRONMENT FOR SCIENCE	\$ 2,301,690	\$ 4,151,811
.....		
GRAND TOTALS	\$39,546,203	\$21,304,647

**Approved—Approved grants are expensed in the year in which the awards are granted, although the grants may be payable over several years.*

***Paid—Paid grants represent actual cash outflows. BWF initiated several major multiyear award programs during the fiscal year covered in this report, and this factor contributes to the significant differences between the approved amounts and paid amounts listed in some sections.*

CAREER DEVELOPMENT

Career Awards in the Biomedical Sciences

Note: Three additional career awards were made in reproductive science and are described in the "Reproductive Science" section.

**Career awards are postdoctoral-faculty bridging awards, and many recipients change institutions upon obtaining a faculty position. For these awardees, indicated with an asterisk, BWF cancels the original grant to the postdoctoral institution and makes a new grant for the remainder of the award to the current institution. In the descriptions below, the faculty-level grants are listed first and the canceled postdoctoral grants are listed second.*

Gregory J. Beitel, Ph.D.
Stanford University School of Medicine
Mechanisms that control and execute the cell movements and shape changes underlying metazoan morphogenesis
Paid \$56,050

Mark Bix, Ph.D.
University of California-San Francisco School of Medicine
Regents of the University of California
Effector CD4+ T-cell development: evidence for the stochastic generation and clonal distribution of a combinatorial cytokine repertoire
Approved \$470,800 Paid \$27,500

Paul S. Buckmaster, D.V.M., Ph.D.
University of California-Davis
Regents of the University of California
Mechanisms of temporal lobe epilepsy
Paid \$56,650

Anita H. Corbett, Ph.D.*
Emory University School of Medicine
Components of the nuclear transport system
Approved \$357,500 Paid \$60,500
Harvard Medical School
Dana-Farber Cancer Institute
Paid \$27,500

Brendan P. Cormack, Ph.D.
Stanford University School of Medicine
Virulence determinants of Candida glabrata
Approved \$412,500

Jeanine D'Armiento, M.D., Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
The role of matrix metalloproteinases in disease
Paid: \$88,000

George Q. Daley, M.D., Ph.D.
Massachusetts Institute of Technology
Whitehead Institute for Biomedical Research
Probing the pathogenesis of chronic myelogenous leukemia
Paid \$56,650

Gregory C. DeAngelis, Ph.D.
Stanford University School of Medicine
Neural mechanisms underlying perceptual feature binding
Approved \$470,800 Paid \$27,500

Tamara L. Doering, M.D., Ph.D.*
Cornell University Medical College
GPIs in fungi: biosynthesis and function
Approved \$357,500 Paid \$60,500
University of California-Berkeley
Regents of the University of California
Paid \$27,500

Michael J. Eck, M.D., Ph.D.*
Harvard Medical School
Dana-Farber Cancer Institute
Structural analysis of protein interactions in signal transduction
Approved \$291,500 Paid \$91,750
Harvard Medical School
Children's Hospital Corporation
Paid \$27,500

Steven Fiering, Ph.D.*
Dartmouth Medical School
Trustees of Dartmouth College
Mutational analysis of the beta-globin locus control region by homologous recombination
Approved \$357,500 Paid \$60,500
University of Washington School of Medicine
Fred Hutchinson Cancer Research Center
Paid \$39,750

Catherine A. Fox, Ph.D.
University of Wisconsin-Madison Medical School
Board of Regents-University of Wisconsin
On the formation of domains of gene expression in eukaryotic chromosomes
Paid \$118,250

Daved H. Fremont, Ph.D.
Columbia University
Trustees of Columbia University
Structural studies of antigen presentation and T-cell activation
Paid \$56,650

Joseph A. Gogos, M.D., Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
Genetic analysis of connectivity in the mammalian olfactory system
Approved \$470,800 Paid \$27,500

Todd R. Golub, M.D.
Harvard Medical School
Dana-Farber Cancer Institute
Models for the molecular pathogenesis of human leukemia
Paid \$119,250

Rachel Green, Ph.D.
University of California-Santa Cruz
Defining the peptidyl transferase center of the ribosome
Approved \$29,150 Paid \$56,650

Gyorgy Hajnoczky, M.D., Ph.D.
Jefferson Medical College
Thomas Jefferson University
Control of cellular function by calcium oscillations
Paid \$88,000

Alan J. Hunt, Ph.D.
University of Colorado
The role of microtubule dynamics in mitotic chromosome movement
Approved \$470,800 Paid \$27,500

Jeffrey S. Isaacson, Ph.D.
University of Washington School of Medicine
Biophysical properties of presynaptic terminals in the central nervous system
Paid \$56,650

Raymond H. Jacobson, Ph.D.
University of California-Berkeley
Regents of the University of California
TBP-related factor and selectivity factor I: probing TBP function in alternative contexts
Approved \$470,800 Paid \$27,500

Suzanne L. Kirby, M.D., Ph.D.
University of North Carolina-Chapel Hill School of Medicine
Proliferative advantage for therapeutic bone marrow
Approved \$412,500 Paid \$27,500

Scott C. Kogan, M.D.
University of California-San Francisco School of Medicine
Regents of the University of California
Use of a transgenic mouse model of acute promyelocytic leukemia to elucidate disease pathogenesis and to improve therapy
Approved \$470,800

Margarethe J. Kuehn, Ph.D.
University of California-Berkeley
Regents of the University of California
Secretory protein sorting in yeast and bacteria
Approved \$470,800 Paid \$27,500

Jeh-Ping Liu, Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
Molecular mechanisms in neural crest specification
Paid \$56,050

Zachary F. Mainen, Ph.D.
State University of New York-Stony Brook
Cold Spring Harbor Laboratory
Optical studies of synaptic plasticity mechanisms
Approved \$470,800 Paid \$27,500

Kelsey C. Martin, M.D., Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
Communication between the synapse and the nucleus during long-lasting synaptic plasticity
Approved \$470,800 Paid \$27,500

Andrea I. McClatchey, Ph.D.*
Harvard Medical School
Massachusetts General Hospital Corporation
The roles of the NF2 tumor suppressor gene product in embryogenesis and tumorigenesis
Paid \$60,500
Massachusetts Institute of Technology
Paid \$27,500

Robert Menard, M.D., Ph.D.
New York University Medical Center
Genetic analysis of malaria sporozoite virulence
Approved \$412,500

Louis J. Muglia, M.D., Ph.D.
Washington University School of Medicine
Molecular genetic analysis of the adrenal and behavioral responses to stress
Approved \$357,500 Paid \$121,000

Charles E. Murry, M.D., Ph.D.
University of Washington School of Medicine
Muscle regeneration after myocardial infarction via gene therapy with MyoD
Paid \$119,250

Inke S. Nathke, Ph.D.
Stanford University School of Medicine
Role of APC/catenin complexes in colon cancer
Paid \$39,750

James Olson, M.D., Ph.D.
University of Washington School of Medicine
Fred Hutchinson Cancer Research Center
NeuroD abrogation in neuroblastoma
Approved \$470,800 Paid \$27,500

George A. Oyler, M.D., Ph.D.
Johns Hopkins University School of Medicine
Signaling pathways of neuronal apoptosis
Paid \$78,250

Martin S. Pavelka Jr., Ph.D.
Albert Einstein College of Medicine
Biosynthesis of the mycobacterial cell wall
Approved \$412,500 Paid \$27,500

Martin R. Pollak, M.D.
Harvard Medical School
Brigham and Women's Hospital
Mouse molecular genetic studies of the extracellular Ca^{2+} -sensing receptor
Approved \$412,500 Paid \$27,500

Ilaria Rebay, Ph.D.*
Massachusetts Institute of Technology
Whitehead Institute for Biomedical Research
Investigation of yan function in Ras1-mediated signal transduction
Approved \$357,500 Paid \$60,500
University of California-Berkeley
Regents of the University of California
Paid \$39,750

Sylvia L. Sanders, Ph.D.*
Massachusetts Institute of Technology
*Analysis of cell-type differences in bud-site selection in *Saccharomyces cerevisiae**
Approved \$357,500 Paid \$93,500
University of California-San Francisco
Regents of the University of California
Paid \$14,575

Konstantin V. Severinov, Ph.D.*
Rutgers, The State University of New Jersey
RNA polymerase and its subunits: structure and function
Approved \$357,500 Paid \$60,500
Konstantin V. Severinov, Ph.D.
Rockefeller University
Paid \$27,500

Judith A. Shizuru, M.D., Ph.D.
Stanford University School of Medicine
Transplantation of purified allogeneic hematopoietic stem cells: applications for transplantation tolerance induction and the treatment of autoimmune disease
Paid \$88,000

Barry P. Sleckman, M.D., Ph.D.
Harvard Medical School
Center for Blood Research Inc.
Lineage specific regulation of T-cell receptor beta rearrangement
Paid \$49,325

David J. Sullivan Jr., M.D.
Washington University School of Medicine
*Iron metabolism in *Plasmodium falciparum**
Approved \$412,500 Paid \$27,500

Michael J. Thirman, M.D.
University of Chicago Medical Center
Functional analyses of the MLL-ELL fusion transcript in acute leukemia
Paid \$78,250

Katharine S. Ullman, Ph.D.
University of California-San Diego
Regents of the University of California
Biochemical dissection of RNA export using in vitro nuclear reconstitution
Paid \$56,650

Peter C. VanBuren, M.D.
University of Vermont School of Medicine
Assessing the role of the thin filament in the altered contractility of heart failure
Paid \$88,000

James A. Waddle, Ph.D.
Washington University School of Medicine
Generation of markers and methods to study asymmetric cell divisions in living Caenorhabditis elegans embryos
Paid \$56,650

William A. Weiss, M.D., Ph.D.
University of California-San Francisco School of Medicine
Regents of the University of California
A transgenic model for neuroblastoma
Paid \$56,650

Ding Xue, Ph.D.
Massachusetts Institute of Technology
Biochemical analysis of CED-3/ICE cysteine proteases and their roles in apoptosis
Paid \$56,650

Cassian Yee, M.D.
University of Washington School of Medicine
Fred Hutchinson Cancer Research Center
Adoptive immunotherapy of melanoma using T-cells specific for potential tumor rejection antigens
Approved \$119,900 Paid \$50,600

John York, Ph.D.
Duke University Medical Center
Nuclear signal transduction: structure and function
Paid \$119,250

SUBTOTAL
Approved \$10,126,050 Paid \$3,004,450

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Hitchings-Elion Fellowships

**These awardees have changed institutions. BWF canceled the grants to the awardees' original institutions and awarded new grants to the current institutions. The new grants are listed first and the canceled grants are listed second.*

Shawn C. Ahmed, Ph.D.
University of Cambridge
Medical Research Council, Cambridge
Genetics of germline immortality in Caenorhabditis elegans
Paid \$49,000

Jill R. Beyette, Ph.D.
University of Leicester
Investigation of proteolytic systems during apoptosis in thymocytes
Approved \$1,941 Paid \$54

Ariel Avilion, Ph.D.
National Institute for Medical Research
Medical Research Council, London
Characterization and functional analysis of Sox-2 during mouse development
Approved \$1,177 Paid \$28,427

D. Scott Bohle, Ph.D.
University of East Anglia
Nitric oxide mediated iron depletion in bacteria
Paid \$4,955

Alison L. Barth, Ph.D.
University of Wales-Cardiff
The role of CREB in plasticity within adult somatosensory cortex
Approved \$150,000 Paid \$52,000

Elena S. Casey, Ph.D.
National Institute for Medical Research
Medical Research Council, London
Defining the primary targets of Xbra, a transcription factor required for mesodermal patterning in Xenopus
Paid \$49,000

Catherine Baty, D.V.M., Ph.D.
University of Oxford
Feline familial hypertrophic cardiomyopathy: a natural model of human familial hypertrophic cardiomyopathy
Approved \$150,000 Paid \$52,000

David Cash, Ph.D.
Ludwig Institute for Cancer Research
Morphological and molecular characterization of RA-induced and methoprene-induced deformities in Xenopus laevis embryos
Approved \$2,200 Paid \$45,700

Dennis Benjamin, Ph.D.
University of Oxford
Folding and function in G proteins
Paid \$50,312

Brian S. DeDecker, Ph.D.
University of Cambridge
Medical Research Council, Cambridge
Structure determination and thermodynamic analysis of mutant p53
Approved \$150,000 Paid \$52,000

Angela K. Eggleston, Ph.D.
Imperial Cancer Research Fund
Protein-protein interactions involved in holliday junction branch migration and resolution
Paid \$42,500

Klaus M. Fiebig, Ph.D.*
Yale University
Theoretical and experimental study of lysozyme folding pathways
Approved \$45,500 Paid \$45,500
University of Oxford
Paid \$1,230

John T. Finn, Ph.D.
University College London School of Medicine
Cell-cycle control of cell number in the retina
Approved \$150,000 Paid \$27,500

Lori S. Friedman, Ph.D.
University of Cambridge
Identifying the basis of variable expressivity in breast and ovarian cancer
Paid \$49,000

FenBiao Gao, Ph.D.
University College London
The control mechanism of oligodendrocyte development in the rodent optic nerve
Paid \$48,121

Maureen V. Gremillion, Ph.D.
University of Oxford
Realistic computational modeling of the early visual pathway
Approved \$1,384 Paid \$49,000

Kenneth A. Johnson, Ph.D.
University of York
Laue diffraction studies on crystals of unliganded r-state hemoglobin
Paid \$52,000

Perry M. Kirkham, Ph.D.
University of Cambridge
Medical Research Council, Cambridge
Electrostatic design of combinatorial antibody libraries
Approved \$6,079 Paid \$53,724

Jacqueline L. S. Milne, Ph.D.
University of Cambridge
Medical Research Council, Cambridge
Structural studies of seven helix cAMP receptors by electron cryo-microscopy
Approved \$150,000 Paid \$52,000

Stephen C. Ogg, Ph.D.
University of Dundee
Intranuclear transport: factors required for correct subnuclear compartmentalization
Approved \$150,000 Paid \$27,500

David D. Pollock, Ph.D.
National Institute for Medical Research
Medical Research Council, London
Maximum likelihood analysis of protein evolution
Paid \$49,438

Jill Rafael, Ph.D.
University of Oxford
The role of utrophin and dystrophin in skeletal muscle and non-muscle tissues
Approved \$150,000 Paid \$52,000

William M. Rideout III, Ph.D.
Massachusetts Institute of Technology
Whitehead Institute for Biomedical Research
Identification and characterization of imprinted loci
Approved \$2,700 Paid \$54,700

Jeffrey H. Rothman, M.D., Ph.D.*
Columbia University
Trustees of Columbia University
Approaches toward sequence-specific DNA recognition
Approved \$45,500 Paid \$45,500
University of Oxford
Approved \$9,853 Paid \$7,000

Michael J. Schell, Ph.D.
University of Cambridge
Brain calcium homeostasis: functional roles of GAP1-IP4BP
Approved \$150,000

David T. Shima, Ph.D.
Imperial Cancer Research Fund
Partitioning of the Golgi apparatus in Schizosaccharomyces pombe
Paid \$24,250

Joseph Terwilliger, Ph.D.
Columbia University
Trustees of Columbia University
Mathematical analysis of complex disease
Approved \$45,500 Paid \$45,500

Laura Trinkle-Mulcahy, Ph.D.

University of Dundee

Identification of a novel protein kinase cascade that mediates the action of insulin

Paid \$49,000

Anthony Varghese, Ph.D.

University of Oxford

Mathematical modeling of effects of antiarrhythmic drugs

Paid \$46,000

Angela J. Villar, Ph.D.*

University of California-San Francisco

Regents of the University of California

Allele-specific expression of Igf-2 and H19 during mouse gametogenesis

Approved \$49,000

Babraham Institute

Approved \$6,925 Paid \$8,974

Peter L. Wang, M.D., Ph.D.

Medical Research Council, Cambridge

Affinity maturation of combinatorial antibody libraries

Paid \$3,000

Pamela Wiener, Ph.D.

University of Warwick

The natural role and evolution of antibiotics

Approved \$7,000 Paid \$24,792

Yimin Wu, Ph.D.

University of Oxford

Protein sorting signals in human malaria parasite

Plasmodium falciparum

Paid \$49,000

Lori M. Zeltser, Ph.D.

United Medical and Dental Schools

Guy's Hospital

Molecular interactions in patterning and boundary formation in the chick diencephalon

Approved \$150,000 Paid \$52,000

SUBTOTAL

Approved \$1,574,758 Paid \$1,342,676

Life Sciences Research Fellowships

These fellowships are administered in partnership with the Life Sciences Research Foundation. BWF awards the primary grant to the foundation, which distributes the funds to the individual awardees.

Michael Brainard, Ph.D. (1996-99)

University of California-San Francisco

Neural and behavioral analysis of vocal learning

Approved \$3,000 Paid \$36,000

Marilyn Diaz, Ph.D. (1997-2000)

University of Miami School of Medicine

Do shark lymphocytes bear a single type of antigen receptor?

Approved \$108,000 Paid \$36,000

Andrew Dittman, Ph.D. (1997-2000)

University of California-Berkeley

Isolation and analysis of goldfish pheromone receptors

Approved \$108,000 Paid \$36,000

Jenny Gumperz, Ph.D. (1996-99)

Harvard Medical School

Brigham and Women's Hospital

T-cell recognition of mycobacterial antigens presented by CD1 molecules

Approved \$3,000 Paid \$36,000

Stephanie Meyer, Ph.D. (1995-98)

Harvard University

Studies of the structure and synthesis of an unusual peptide involved in morphological differentiation

in Streptomyces coelicolor

Paid \$36,000

Jeannine M. Petersen, Ph.D. (1997-2000)

University of Wisconsin-Madison School of Medicine

Understanding mechanisms and control of the nuclear transport pathway

Approved \$108,000 Paid \$36,000

Cynthia L. Phillips, Ph.D. (1995-98)
University of Utah
Structural studies of APRTase
Paid \$36,000

Joseph Wedekind, Ph.D. (1996-99)
Stanford University Medical Center
The structural basis of catalysis for a hammerhead ribozyme
Approved \$3,000 Paid \$36,000

SUBTOTAL
Approved \$333,000 Paid \$288,000

Wellcome Research Travel Grants

**Grants are related to history of medicine.*

Abdul I. Barakat, Ph.D.
University of California-Davis
The role of hemodynamics in atherosclerosis
Approved \$1,950 Paid \$1,950

Estelle Cohen, Ph.D.*
University of Minnesota
Constructing biology as social knowledge, 1660-1860
Approved \$9,500 Paid \$9,500

Lois M. Barnett, Ph.D.*
University of Southern Mississippi
Responses of Britain's interwar Ministry of Health and Medical Research Council to independent investigations into tuberculosis and other diet-based illness
Approved \$3,890 Paid \$3,890

Randall L. Commissaris, Ph.D.
Wayne State University
Molecular markers for conditioned and unconditioned fear and/or anxiety in the rat: response to anxiolytic treatments
Approved \$12,300 Paid \$12,300

Victoria Bautch, Ph.D.
University of North Carolina-Chapel Hill
The control of vascular pattern formation via mouse embryo manipulations
Approved \$12,040 Paid \$12,040

Stephen J. Cross, Ph.D.*
Rice University
Julian Huxley and eugenics, birth control, and population
Approved \$5,950 Paid \$5,950

Alexander G. Bearn, M.D.*
Rockefeller University
Clifford Allbutt (1836-1925): a scientific biography of the Regius Professor of Physic
Paid \$6,756

Gerald L. DeNardo, M.D.
University of California-Davis
Generation of bispecific antibodies for treatment of B-lymphocytic malignancies such as lymphoma and leukemia
Approved \$9,680 Paid \$9,680

Robert M. Brenner, Ph.D.
Oregon Health Sciences University
Growth factors and matrix metalloproteinases in the human endometrium
Approved \$9,200 Paid \$9,200

Sally J. DeNardo, M.D.
University of California-Davis
Development of immune phage libraries for generation of clinically useful antibodies: targeted cancer therapies
Approved \$8,300 Paid \$8,300

Simon R. Cherry, Ph.D.
University of California-Los Angeles School of Medicine
Regents of the University of California
Simultaneous NMR spectroscopy and positron emission tomography for studying cardiac metabolism
Approved \$2,570 Paid \$2,570

Allen J. Dennis, M.D.*
Medical College of Georgia
Biography of William Charles Wells, M.D.
Approved \$7,750 Paid \$7,750

Judith Eisen, Ph.D.
University of Oregon
Development of the epiphysis in wild-type and mutant zebrafish embryos
Approved \$9,950 Paid \$9,950

Robert P. Erickson, M.D.
University of Arizona Health Sciences Center
Controlled deletions of a developmentally regulated gene
Paid \$9,821

Maria H. Frawley, Ph.D.*
Elizabethtown College
Thinking through illness: Victorian invalid literature
Approved \$352 Paid \$352

D. Gabrilovich, M.D., Ph.D.
Vanderbilt University School of Medicine
Effect of tumor-derived factors on the ultrastructure of dendritic cells
Approved \$3,970 Paid \$3,970

Allen H. Garverick, Ph.D.
University of Missouri
Curators of the University of Missouri
Cellular and molecular mechanisms controlling ovarian follicular development in cattle
Approved \$8,106 Paid \$8,106

Adrian R. L. Gear, D.Phil.
University of Virginia
Regulation of platelet calcium ATPases
Approved \$14,000 Paid \$14,000

Diane L. Hatchell, Ph.D.
Duke University Medical Center
Does programmed cell death limit the yield of viable islets of Langerhans for transplantation?
Approved \$8,035 Paid \$8,035

Edward Hawrot, Ph.D.
Brown University
Structural basis for the interaction between alpha-bungarotoxin and the nicotinic acetylcholine receptor
Approved \$15,000 Paid \$15,000

Ashok N. Hegde, Ph.D.
Columbia University
Trustees of Columbia University
Olfactory memory: molecular, cellular, and behavioral analysis
Approved \$3,200 Paid \$3,200

Reinhold J. Hutz, Ph.D.
University of Wisconsin-Milwaukee
Immunologic and molecular approaches to evaluating the mechanism of estrogen action in ovarian function
Approved \$2,660 Paid \$2,660

Damir Janigro, Ph.D.
University of Washington
In vitro properties of blood-brain barrier endothelial cells
Approved \$2,300 Paid \$2,300

Jon C. Lewis, Ph.D.*
Wake Forest University
Bowman Gray School of Medicine
The influence during 1900-70 of British biomedical sciences on the evolution of hemostasis research in the United States, with an emphasis on von Willebrand's disease
Approved \$7,350 Paid \$7,350

Ruth Leys, Ph.D.*
Johns Hopkins University
Trauma and medical catharsis in World War II: the papers of William Sargant
Approved \$3,068 Paid \$3,068

Richard F. Loeser Jr., M.D.
Wake Forest University
Bowman Gray School of Medicine
Growth factors and aging in cartilage
Approved \$13,759 Paid \$13,759

Stephen W. Looney, Ph.D.
University of Louisville School of Medicine
Educational outreach across key primary care interfaces: an approach for improving prescribing in nursing homes
Approved \$2,200 Paid \$2,200

Michael W. Miller, Ph.D.
University of Iowa College of Medicine
Role of p53 in neuronal death
Approved \$11,200 Paid \$11,200

Barry E. Milligan, Ph.D.*
Wright State University
Nineteenth-century British medicine and culture
Approved \$13,615 Paid \$13,615

Sergey Nuzhdin, Ph.D.
University of California-Davis
Determination of the genomic transposition rate in human from the frequency distribution of LINE-1 occupation sites
Approved \$3,380 Paid \$3,380

Joseph R. Pisegna, M.D.
University of California-Los Angeles
Characterization of the signal transduction, internalization, and desensitization of the human pituitary adenylate cyclase activating polypeptide receptor
Approved \$5,800

Jeffrey T. Potts, Ph.D.
University of Texas Southwestern Medical Center-Dallas
The role of somatosensory afferents on the ionic membrane currents of neurons in the nucleus tractus solitarius: a whole-cell patch clamp recording study
Approved \$8,500 Paid \$8,500

William H. Ridder, O.D., Ph.D.
Southern California College of Optometry
The effect of stimulus duration on sweep VEP acuity estimates
Approved \$3,700 Paid \$3,700

David M. Rodman, M.D.
University of Colorado Health Sciences Center
Gene transfer in experimental pulmonary hypertension
Approved \$5,500

Barry P. Rosen, Ph.D.
Wayne State University School of Medicine
Catalytic mechanism of a resistance ATPase
Approved \$6,000

Susan A. Rotenberg, Ph.D.
Queens College
Queens College Foundation
The role of protein kinase C in metastatic human melanoma
Approved \$7,350 Paid \$7,350

Anthony Sclafani, Ph.D.
Brooklyn College of CUNY
Research Foundation of CUNY
Neuropharmacological and behavioral basis of learned food preferences
Approved \$5,700 Paid \$5,700

Aleem Siddiqui, Ph.D.
University of Colorado Health Sciences Center
Role of hepatitis B virus X protein in DNA repair
Approved \$14,000 Paid \$14,000

Ole Stalheim, D.V.M., Ph.D.*
Iowa State University College of Veterinary Medicine
Veterinary college curricula in the United Kingdom: guide to reform in North America?
Approved \$6,229 Paid \$6,229

George E. Stelmach, Ed.D.
Arizona State University
Basal ganglia impairment and fine motor II
Approved \$10,350 Paid \$10,350

Jennifer Stine, Ph.D.*
California Institute of Technology
Clerical medicine in the early 17th century
Approved \$3,050 Paid \$3,050

Wayne S. Wild, M.D.*
Brandeis University
Medicine by letter in 18th century England
Approved \$3,500 Paid \$3,500

Doris T. Zallen, Ph.D.*
Virginia Polytechnic Institute and State University
The role of ecological genetics in the development of human genetics (and its medical applications) in the United Kingdom
Approved \$14,000 Paid \$14,000

SUBTOTAL
Approved \$298,954 Paid \$298,231

Wellcome Trust Travel Grants

These grants are made by the Wellcome Trust, BWF's sister philanthropy in the United Kingdom, to support visits by U.K. and Irish researchers to the United States. BWF makes grants to the host institutions as a contribution to expenses incurred during the visit.

California Institute of Technology
Beulah Leitch
University of Durham
Inhibitory feedback neurons in oscillatory processing of olfactory information
Approved \$1,000 Paid \$1,000

Harvard Medical School
Precilla Choi
Keele University
Anabolic steroid associated violence in men towards women
Approved \$1,000 Paid \$1,000

Harvard Medical School
D. Parkinson
Sheffield Hallam University
Effect of new differentiation factors on differentiation of Ntera2 cells
Approved \$1,000 Paid \$1,000

Medical University of South Carolina
Keith Williams
University of Wales
Finite element analysis of adhesion tests in dental prostheses
Approved \$1,000 Paid \$1,000

University of California-Irvine
J. W. Fawcett
University of Cambridge
Nerve regeneration
Approved \$1,000 Paid \$1,000

University of California-Irvine
R. F. Halliwell
University of Durham
Effects of NSAID's on neuronal ligand-gated ion channels
Approved \$730 Paid \$730

University of California-Los Angeles
M. V. Sofroniew
University of Cambridge
Potential roles of nerve growth factor and other growth factors or cytokines in the pathogenesis of neuropathic pain in a well characterized model of nerve injury
Approved \$1,000 Paid \$1,000

University of Houston
Keziah Latham
Aston University
Effects of age on visual performance in central and peripheral vision
Approved \$1,000 Paid \$1,000

University of Illinois-Chicago
A. Rahman
King's College London
Active anti-diabetic principles of the Indian plant Gymnema sylvestre
Approved \$1,000 Paid \$1,000

University of Massachusetts
Tomoko Kamishima
University of Glasgow
Kea channels and SR ryanodine receptors in smooth muscle cells
Approved \$1,000 Paid \$1,000

University of Massachusetts
J. G. McCarron
University of Glasgow
The distribution of cottage-dependent Ca⁺⁺ channels and ryanodine receptors in single vascular smooth muscle cells
Approved \$1,000 Paid \$1,000

University of Washington
J. R. Garrett
King's College School of Medicine and Dentistry
Factors controlling the blood flow through submandibular glands in rats
Approved \$712 Paid \$712

University of Wisconsin-Madison School
of Veterinary Medicine
D. Turner
University of Leeds
Serotonergic neuromodulation of respiratory plasticity during exercise
Approved \$1,000 Paid \$1,000

Washington University School of Medicine
Jacqueline Barry
University of Edinburgh
Repeated visualization of the neuromuscular functions of mice following nerve section
Approved \$1,000 Paid \$1,000

SUBTOTAL
Approved \$13,442 Paid \$13,442

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Other Grants

In addition to its competitive awards, BWF makes noncompetitive grants for activities that are closely related to its major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

American Society for Cell Biology
Support for BWF Student Travel Awards for Young Scientists to attend 1996 combined meeting of the International Congress on Cell Biology and the American Society for Cell Biology
Paid \$10,000

American Society for Cell Biology
Support for BWF Student Travel Awards for Young Scientists to attend 1997 combined meeting of the International Congress on Cell Biology and the American Society for Cell Biology
Approved \$5,000 Paid \$5,000

Conference on Professionals in Science and Technology
Support for survey of opportunities for recent doctorates in biochemistry and molecular biology
Approved \$50,000

Radcliffe College
Support for 1997 biomedical fellowships for postdoctoral women scientists
Approved \$331,300 Paid \$106,300

Radcliffe College
Support for 1996 biomedical fellowships for postdoctoral women scientists
Paid \$50,950

Stanford University School of Medicine
Support for distribution of the report At the Edge of a New Frontier: a Profile of the Stanford University Biomedical Ph.D. Class of 1996 and Recommendations for the Future
Approved \$1,000 Paid \$1,000

SUBTOTAL
Approved \$387,300 Paid \$173,250

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TOTAL CAREER DEVELOPMENT
Approved \$12,733,504 Paid \$5,120,049

EMERGING INFECTIOUS DISEASES

Scholar Awards in Molecular Parasitology

Bruce M. Christensen, Ph.D.
University of Wisconsin-Madison
Board of Regents-University of Wisconsin
Cellular, biochemical, and molecular mechanisms that control compatibility/incompatibility of mosquito vectors for the parasites they transmit
Paid \$80,000

Daniel Goldberg, M.D., Ph.D.
Washington University School of Medicine
Hemoglobin metabolism in Plasmodium falciparum
Approved \$400,000 Paid \$20,000

Anthony A. James, Ph.D.
University of California-Irvine
Regents of the University of California
Reduction of the transmission of vector-borne diseases by genetic manipulation of vector arthropods
Paid \$80,000

Keith A. Joiner, M.D.
Yale University School of Medicine
A molecular analysis of secretion in Toxoplasma gondii
Paid \$80,000

Scott M. Landfear, Ph.D.
Oregon Health Sciences University School of Medicine
Biology of membrane transporters in Leishmania parasites
Approved \$400,000 Paid \$20,000

Richard M. Locksley, M.D.
University of California-San Francisco School of Medicine
Host immune response to Leishmania
Paid \$60,000

James H. McKerrow, M.D., Ph.D.
University of California-San Francisco
Regents of the University of California
Parasite proteases: analysis of structure-function relationships and structure-based drug design
Paid \$80,000

William Petri Jr., M.D., Ph.D.
University of Virginia School of Medicine
Adherence and cytolysis by Entamoeba histolytica
Paid \$80,000

David G. Russell, Ph.D.
Washington University School of Medicine
Molecular mechanisms employed by Leishmania and Mycobacterium to ensure their continued success as intramacrophage parasites
Paid \$80,000

Rick L. Tarleton, Ph.D.
University of Georgia
University of Georgia Research Foundation
Immunity and disease in Trypanosoma cruzi infection
Paid \$80,000

Buddy Ullman, Ph.D.
Oregon Health Sciences University School of Medicine
Oregon Health Sciences Foundation
Chemotherapy and drug resistance in parasitic protozoa, Leishmania and Trypanosoma
Paid \$80,000

Elisabetta Ullu, Ph.D.
Yale University School of Medicine
A molecular analysis of the nucleus in Trypanosoma brucei
Paid \$80,000

SUBTOTAL
Approved \$800,000 Paid \$820,000

New Investigator Awards in Molecular Parasitology

John H. Adams, Ph.D.
University of Notre Dame
Molecular analysis of the malaria merozoite apical complex
Approved \$195,000 Paid \$32,500

James D. Bangs, Ph.D.
University of Wisconsin-Madison Medical School
Board of Regents-University of Wisconsin
Secretory and endocytic trafficking in Trypanosoma brucei
Approved \$195,000 Paid \$32,500

James P. Bruzik, Ph.D.
Case Western Reserve University
Examination of the role of protein factors in trans-splicing in nematodes and trypanosomatids
Approved \$30,000 Paid \$72,500

Christopher A. Hunter, Ph.D.
University of Pennsylvania School of Veterinary Medicine
Role of accessory molecules in the regulation of natural killer responses during infection
Approved \$45,000 Paid \$32,500

Laura Landweber, Ph.D.
Princeton University
Comparative sequence analysis and functional in vitro selection experiments
Approved \$15,000 Paid \$40,000

Jonathan LeBowitz, Ph.D.
Purdue University
Purdue Research Foundation
Structure and function of the Leishmania paraflagellar rod
Approved \$195,000 Paid \$32,500

Gwo-Shu M. Lee, Ph.D.
New York University Medical Center
The flagellar pocket proteins of African trypanosomes
Approved \$30,000 Paid \$40,000

Dmitri A. Maslov, Ph.D.
University of California-Riverside
Regulation of gene expression in the kinetoplast of trypanosomatid protozoa
Approved \$30,000 Paid \$72,500

Kojo Mensa-Wilmot, Ph.D.
University of Georgia
Regulation of GPI Phospholipase C of Trypanosoma brucei
Approved \$15,000 Paid \$40,000

Marc Ouellette, Ph.D.
Laval University
Drug resistance mechanisms in Leishmania
Approved \$45,000 Paid \$72,500

Edward J. Pearce, Ph.D.
Cornell University College of Veterinary Medicine
Regulation of parasite-specific immune responses
Approved \$15,000 Paid \$40,000

Eric Pearlman, Ph.D.
Case Western Reserve University School of Medicine
Cell recruitment in helminth-induced allergic inflammation
Approved \$195,000 Paid \$32,500

Margaret A. Phillips, Ph.D.
University of Texas Southwestern Medical Center-Dallas
Selection of peptides which inhibit parasite ornithine decarboxylases
Approved \$30,000 Paid \$72,500

Laurie K. Read, Ph.D.
State University of New York-Buffalo
Research Foundation of SUNY
Mitochondrial RNA processing in Trypanosoma brucei
Approved \$45,000 Paid \$72,500

Steven L. Reiner, M.D.
University of Chicago
Parasite-specific transgenic mice and the genetic control of leishmaniasis
Approved \$30,000 Paid \$72,500

David S. Roos, Ph.D.
University of Pennsylvania
Biological problems in Toxoplasma gondii and related apicomplexan parasites
Approved \$15,000 Paid \$40,000

SUBTOTAL
Approved \$1,125,000 Paid \$797,500

New Initiatives in Malaria Research

Jonathan A. Ellman, Ph.D.
University of California-Berkeley
Irwin D. Kuntz, Ph.D.
University of California-San Francisco School of Pharmacy
Regents of the University of California
Inhibitors of plasmepsin II for malaria treatment
Approved \$300,000 Paid \$25,000

Kasturi Haldar, Ph.D.
Stanford University School of Medicine
Secretory targeting signals in Plasmodia
Paid \$100,000

James W. Kazura, M.D.
Case Western Reserve University School of Medicine
Nicholas Schork, Ph.D.
Case Western Reserve University
Genetic dissection of malaria morbidity
Approved \$300,000 Paid \$25,000

Donald J. Krogstad, M.D.
Tulane University Medical Center
Frank B. Cogswell, Ph.D.
Tulane Regional Primate Research Center
Tulane University
Aminoquinolines active against drug-resistant Plasmodium falciparum
Paid \$75,000

Victor Nussenzweig, M.D.
New York University Medical Center
Ruth S. Nussenzweig, M.D., Ph.D.
New York University Medical Center
The function of sporozoite membrane proteins investigated in genetically engineered malaria parasites
Paid \$100,000

Pradipsinh K. Rathod, Ph.D.
Catholic University of America
Accelerated drug resistance in Plasmodium falciparum
Approved \$300,000 Paid \$25,000

SUBTOTAL
Approved \$900,000 Paid \$350,000

Scholar Awards in Molecular Pathogenic Mycology

Judith Berman, Ph.D.
University of Minnesota
Use of Saccharomyces cerevisiae to study molecular mechanisms of Candida albicans pathogenicity
Approved \$400,000 Paid \$20,000

William A. Fonzi, Ph.D.
Georgetown University
Environmental signals and virulence of Candida albicans
Paid \$80,000

William E. Goldman, Ph.D.
Washington University School of Medicine
Probing the parasitic lifestyle of Histoplasma capsulatum
Paid \$80,000

Bruce Klein, M.D.
University of Wisconsin-Madison Medical School
Board of Regents-University of Wisconsin
Genetic immunization against pathogenic fungi
Paid \$80,000

Aaron P. Mitchell, Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
Analysis of the Candida CaRIM transduction pathway
Approved \$400,000 Paid \$20,000

SUBTOTAL
Approved \$800,000 Paid \$280,000

New Investigator Awards in Molecular Pathogenic Mycology

Haoping Liu, Ph.D.
University of California-Irvine College of Medicine
Regents of the University of California
Regulation of dimorphism in Candida albicans
Approved \$45,000 Paid \$72,500

Michelle C. Momany, Ph.D.
University of Georgia
University of Georgia Research Foundation
Identification of novel cell wall components in Aspergillus fumigatus
Approved \$195,000 Paid \$32,500

Theodore C. White, Ph.D.
University of Washington School of Public Health
and Community Medicine
Seattle Biomedical Research Institute
Transcriptional regulation of drug resistance in Candida albicans
Approved \$195,000 Paid \$32,500

SUBTOTAL
Approved \$435,000 Paid \$137,500

Other Grants

In addition to its competitive awards, BWF makes noncompetitive grants for activities that are closely related to its major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

Canadian Society for Microbiology
Support for society's 1997 annual meeting
Approved \$4,000 Paid \$4,000

Gordon Research Conferences
Support for 1997 Conference on Parasitism
Approved \$10,000 Paid \$10,000

Centers for Disease Control and Prevention
CDC Foundation
Support for 1998 CDC International Conference on Emerging Diseases
Approved \$5,000

Harvard School of Public Health
President and Fellows of Harvard College
Support for cloning strategies for Plasmodium falciparum DNA
Approved \$89,500 Paid \$89,500

Centers for Disease Control and Prevention
CDC Foundation
Support for public health microbiologists to attend workshop on Laboratory Identification of Pathogenic Fungi from Clinical and Environmental Sources
Approved \$1,500 Paid \$1,500

Institute for Genomic Research
Support for complete nucleotide sequence of Plasmodium falciparum chromosome 14
Approved \$1,250,000 Paid \$1,250,000

Columbia University College of Physicians and Surgeons
Support for laboratory supplies associated with the Molecular Medical Mycology training course, in Woods Hole
Approved \$3,000 Paid \$3,000

International Eye Foundation
Support for multicenter study of ocular pathology in severe malaria
Approved \$65,900

Duke University Medical Center
Support for planning grant to establish a Duke-Oxford collaboration in malaria research in Kenya
Approved \$4,800 Paid \$4,800

Keystone Symposia
Support for 1998 meeting on genetic manipulation of insects
Approved \$5,000

Gordon Research Conferences
Support for 1997 Conference on Microbial Population Biology
Approved \$2,500 Paid \$2,500

Keystone Symposia
Support for 1997 meeting on molecular and cellular biology of apicomplexan protozoans
Paid \$5,000

Malaria Foundation Inc.
Support for general activities
Approved \$75,000 Paid \$75,000

Malaria Foundation Inc.
Support for malaria genome focus group meeting
Approved \$10,000 Paid \$10,000

Malaria Foundation Inc.
Support for 1997 Second Global Meeting on Parasitic Diseases, in India
Approved \$5,000 Paid \$5,000

Marine Biological Laboratory
Support for Biology of Parasitism training course
Paid \$125,000

Marine Biological Laboratory
Support for Molecular Mycology training course
Paid \$100,000

Marine Biological Laboratory
Support for 1997 meeting on immunoparasitology
Approved \$10,000 Paid \$10,000

Mount Auburn Hospital
President and Fellows of Harvard College
Support for scientists to attend conference on Emerging Infections: Origins, Ecology, Costs, and Prevention
Approved \$5,000 Paid \$5,000

New York University School of Medicine
Support for high resolution optical mapping of Plasmodium falciparum chromosome 2
Approved \$50,000 Paid \$50,000

Oregon Health Sciences University School of Medicine
Support for 1997 West Coast Kinetoplastid Conference
Approved \$7,500 Paid \$7,500

Roswell Park Cancer Institute
Health Research Inc.
Support for construction of a Plasmodium falciparum DNA library using PAC and BAC vectors
Approved \$50,000 Paid \$50,000

Stanford University School of Medicine
Support for Malaria Genome Project: large-scale sequencing of Plasmodium falciparum chromosome 12
Approved \$1,250,000 Paid \$1,250,000

Stanford University School of Medicine
Support for sequencing the Candida albicans genome
Paid \$150,000

Stanford University School of Medicine
Support for small-scale approach to initiating the sequencing of the genome of Plasmodium falciparum
Approved \$50,000 Paid \$50,000

University of California-Davis School
of Veterinary Medicine
Regents of the University of California
Support for digital pathology atlas linking tropical viral infections with tropical protozoan infections
Approved \$15,000 Paid \$15,000

University of Nevada-Reno School of Medicine
Board of Regents of the UCCSN
Support for 1997 Fourth NIAID Workshop in Medical Mycology: Host Responses to Fungi
Approved \$20,000 Paid \$20,000

SUBTOTAL
Approved \$2,988,700 Paid \$3,292,800

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TOTAL EMERGING INFECTIOUS DISEASES
Approved \$7,048,700 Paid \$5,677,800

New Investigator Awards in the Basic Pharmacological Sciences

Effective with the 1998 award year, this program is combined into the New Investigator Awards in the Pharmacological and Toxicological Sciences.

Carolyn R. Bertozzi, Ph.D.
University of California-Berkeley
Regents of the University of California
Engineering novel cell surface chemistry for selective tumor cell targeting
Approved \$195,000 Paid \$32,500

Craig M. Crews, Ph.D.
Yale University
Exploring the pharmaceutical potential of PKC isozyme regulation using combinatorial chemistry
Paid \$65,000

Cynthia Czajkowski, Ph.D.
University of Wisconsin-Madison
Board of Regents-University of Wisconsin
Molecular determination of the benzodiazepine and GABA binding sites of the GABA_A receptor
Paid \$65,000

Raymond J. Deshaies, Ph.D.
California Institute of Technology
Ubiquitin-dependent proteolysis
Approved \$195,000 Paid \$32,500

Haian Fu, Ph.D.
Emory University
Role of 14-3-3 proteins in signal transduction and oncogenesis
Paid \$65,000

Linda Hicke, Ph.D.
Northwestern University
Ubiquitin-dependent internalization and degradation of signal transducing receptors
Approved \$195,000 Paid \$32,500

Kevin R. Jones, Ph.D.
University of Colorado-Boulder
Function of brain-derived neurotrophic factor in the basal ganglia
Paid \$65,000

Wendell Lim, Ph.D.
University of California-San Francisco School of Medicine
Regents of the University of California
Protein recognition in signal transduction: the structural and energetic basis of complex SH3 domain mediated interactions
Approved \$195,000 Paid \$32,500

Stephen Michnick, Ph.D.
University of Montreal Faculty of Medicine
Protein-fragment complementation assays: a general strategy for identifying relationships among proteins in vivo
Approved \$195,000 Paid \$32,500

Garry P. Nolan, Ph.D.
Stanford University School of Medicine
Dominant negative effectors of differentiation and intracellular signaling
Paid \$65,000

Ronald Taussig, Ph.D.
University of Michigan Medical School
Regents of University of Michigan
Genetic analysis of mammalian adenylyl cyclase isoforms
Approved \$195,000 Paid \$32,500

SUBTOTAL
Approved \$1,170,000 Paid \$520,000

Scholar Awards in Toxicology

Effective with the 1998 award year, this program is superseded by the New Investigator Awards in the Pharmacological and Toxicological Sciences.

Kim Boekelheide, M.D., Ph.D.
Brown University School of Medicine
The role of cytoskeletal perturbation in testicular injury
Paid \$80,000

Christopher Bradfield, Ph.D.
University of Wisconsin-Madison
Board of Regents-University of Wisconsin
Molecular genetic approaches to study dioxin toxicology
Paid \$80,000

Janice E. Chambers, Ph.D.
Mississippi State University College
of Veterinary Medicine
*To understand factors contributing to toxicity so that
predictions of which compounds pose the greatest hazard
to man and/or animals can be developed*
Paid \$85,000

Titia de Lange, Ph.D.
Rockefeller University
Cell-based assays for telomerase toxicity
Approved \$400,000 Paid \$20,000

Debra L. Laskin, Ph.D.
Rutgers University College of Pharmacy
Rutgers, The State University of New Jersey
*To analyze the role of nitric oxide in cytokine-induced
apoptosis in the liver*
Paid \$80,000

Ellen Li, M.D., Ph.D.
Washington University School of Medicine
Retinoic acid binding proteins and retinoid toxicity
Paid \$80,000

Curtis J. Omiecinski, Ph.D.
University of Washington School of Public Health
and Community Medicine
Molecular biological approaches to toxicology
Paid \$80,000

Robert A. Roth Jr., Ph.D.
Michigan State University
*Chemically induced liver injury and pulmonary
vascular injury*
Paid \$80,625

Leona Samson, Ph.D.
Harvard School of Public Health
President and Fellows of Harvard College
*Study of the body's natural defenses against alkylating
agents*
Paid \$80,000

Dennis J. Thiele, Ph.D.
University of Michigan Medical School
Regents of University of Michigan
Molecular mechanisms of metal detoxification
Paid \$80,000

Bennett Van Houten, Ph.D.
University of Texas Medical Branch-Galveston
Gene-specific repair studies in mice and humans
Paid \$80,000

SUBTOTAL
Approved \$400,000 Paid \$825,625

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New Investigator Awards in Toxicology

Effective with the 1998 award year, this program is combined into the New Investigator Awards in the Pharmacological and Toxicological Sciences.

Qin M. Chen, Ph.D.
University of Arizona College of Medicine
Tumor suppressor mediated oxidative stress responses
Approved \$195,000 Paid \$32,500

Jeffrey A. Johnson, Ph.D.
University of Kansas Medical Center
Brain glutathione s-transferases and NAD(P)H:quinone oxidoreductase: a role in preventing neurotoxicity
Approved \$195,000 Paid \$32,500

Yoichi Osawa, Ph.D.
University of Michigan Medical School
Regents of University of Michigan
Chemical approaches to toxicology
Approved \$195,000 Paid \$32,500

Jennifer A. Pietenpol, Ph.D.
Vanderbilt University School of Medicine
Mechanism of cell cycle checkpoints following genotoxic stress
Approved \$195,000 Paid \$32,500

SUBTOTAL
Approved \$780,000 Paid \$130,000

Scholar Awards in Experimental Therapeutics

Effective with the 1998 award year, this program is superseded by the Clinical Scientist Awards in Translational Research.

Arturo Casadevall, M.D., Ph.D.
Albert Einstein College of Medicine
Development of novel antibody-based drugs against bacterial and fungal pathogens
Paid \$80,000

Elazer R. Edelman, M.D., Ph.D.
Harvard Medical School
Brigham and Women's Hospital
Continuous perivascular drug delivery
Paid \$80,000

Alfred I. Geller, Ph.D.
Harvard Medical School
Children's Hospital Corporation
Gene therapy for Parkinson's disease with HSV-1 vectors
Paid \$60,000

Jonathan D. Gitlin, M.D.
Washington University School of Medicine
Mechanisms of cellular copper homeostasis
Approved \$400,000 Paid \$20,000

Daniel L. Kaufman, Ph.D.
University of California-Los Angeles School of Medicine
Biopharmaceuticals for the prevention of insulin-dependent diabetes mellitus
Approved \$400,000 Paid \$20,000

Alan M. Krensky, M.D.
Stanford University School of Medicine
HLA-derived peptides as novel immunosuppressives
Paid \$80,000

Thomas Michel, M.D., Ph.D.
Harvard Medical School
Brigham and Women's Hospital
Nitric oxide synthases and vascular signal transduction
Paid \$80,000

James W. Mier, M.D.
Tufts University School of Medicine
New England Medical Center Hospitals Inc.
Cytokine therapy, in particular interleukin 2 therapy, for patients with cancer
Paid \$17,500

Drew M. Pardoll, M.D., Ph.D.
Johns Hopkins University School of Medicine
Molecular engineering of the antitumor immune response
Paid \$80,000

David H. Perlmuter, M.D.
Washington University School of Medicine
Receptor for amyloid-beta peptide
Paid \$80,000

Stephen Rayport, M.D., Ph.D.
Columbia University College of Physicians and Surgeons
Trustees of Columbia University
Actions of psychotropic drugs at central nervous system synapses
Paid \$80,000

Theresa A. Shapiro, M.D., Ph.D.
Johns Hopkins University School of Medicine
Development of new antiparasitic chemotherapy
Paid \$80,000

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Other Grants

In addition to its competitive awards, BWF makes noncompetitive grants for activities that are closely related to its major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

AMC Cancer Research Center
Support for 1997 conference on Environmental Skin Carcinogenesis: UV and Chemically Induced Cancer Implications for Risk Assessment
Approved \$1,000 Paid \$1,000

American Foundation for Pharmaceutical Education
Support for 1997 and 1998 New Investigators Program for Pharmacy Faculty
Approved \$386,000 Paid \$193,000

American Physiological Society
Support for 1997 meeting on Genomics to Physiology and Beyond: How Do We Get There?
Approved \$10,000 Paid \$10,000

American Society for Pharmacology and Experimental Therapeutics
Support for colloquium held in conjunction with the joint meeting of the American Society for Pharmacology and Experimental Therapeutics and the British Pharmacological Society
Approved \$15,000 Paid \$15,000

Duke University Medical Center
Support for joint research program, Identification of Human Genes that Predispose to a Variety of Chronic Diseases, between Duke and Oxford Universities
Approved \$25,000 Paid \$25,000

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TOTAL THERAPEUTIC SCIENCES
Approved \$3,613,500 Paid \$2,583,625

Steven Shoelson, M.D., Ph.D.
Harvard Medical School
Joslin Diabetes Center Inc.
Targeting SH2 domains in tyrosine kinase signaling
Paid \$80,000

SUBTOTAL
Approved \$800,000 Paid \$837,500

Gordon Research Conferences
Support for 1997 Conference on Mechanisms of Membrane Transport Proteins
Approved \$5,000 Paid \$5,000

University of Dundee
Support for Third International Sulfation Workshop
Approved \$1,000 Paid \$1,000

University of Michigan Medical School
Regents of University of Michigan
Support for meeting on Copper Transport and Its Disorders: Molecular and Cellular Aspects, in Italy
Approved \$10,000 Paid \$10,000

University of Washington School of Medicine
University of Washington Foundation
Support for 1997 workshop on Cellular Regulation by Protein Phosphorylation: 40 Years of Progress
Approved \$10,500 Paid \$10,500

SUBTOTAL
Approved \$463,500 Paid \$270,500

Career Awards in the Biomedical Sciences

These awards targeted at reproductive sciences are made through the Career Awards in the Biomedical Sciences program; the majority of the career awards are listed under the "Career Development" section of the Grants Index.

David E. Cummings, M.D.
University of Washington School of Medicine
Studies of spermatogenesis and metabolism using mutant mice
Approved \$470,800 Paid \$27,500

Mala S. Mahendroo, Ph.D.
University of Texas Southwestern Medical Center-Dallas
Characterization of fecundity and parturition defects in mice deficient in steroid 5 alpha-reductase type 1
Approved \$470,800 Paid \$27,500

Carmen J. Williams, M.D.
University of Pennsylvania School of Medicine
Trustees of the University of Pennsylvania
Signal transduction mechanisms during mouse egg activation
Approved \$532,400 Paid \$27,500

SUBTOTAL
Approved \$1,474,000 Paid \$82,500

Obstetrics and Gynecology Research Fellowships

This program is administered in partnership with the American Association of Obstetricians and Gynecologists Foundation. BWF awards the primary grant to the foundation, which distributes the funds to the individual awardees.

Donna S. Dizon-Townson, M.D. (1996-98)
University of Utah
Isolation of trophoblast and decidual genes unique to different gestational ages of early human pregnancy without prior knowledge of gene function or structure
Paid \$40,000

Henry L. Galan, M.D. (1997-2000)
University of Colorado Health Sciences Center
Role of endothelial nitric oxide in the fetal placental unit in an experimental model of intrauterine growth restriction
Approved \$144,000 Paid \$24,000

Kee-Hak Lim, M.D. (1995-97)
University of California-San Francisco
Effect of HIV-1 protein Tat on trophoblast expression of HLA-G
Paid \$20,000

American Association of Obstetricians
and Gynecologists Foundation
Administrative fee for site visits, advisory committee, and annual fellows meetings
Approved \$10,000 Paid \$10,000

SUBTOTAL
Approved \$154,000 Paid \$94,000

Other Grants

In addition to its competitive awards, BWF makes noncompetitive grants for activities that are closely related to its major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

Marine Biological Laboratory
Support for Frontiers in Reproduction training course
Approved \$350,000

Marine Biological Laboratory
Support for meetings of the Americas Reproductive Scientists Network
Paid \$5,000

Society for the Study of Reproduction
Support for postdoctoral fellows to attend society's 1997 annual meeting
Approved \$5,000 Paid \$5,000

University of North Carolina-Chapel Hill School of Medicine
Support for 1997 annual meeting of Triangle Consortium for Reproductive Biology
Approved \$2,500 Paid \$2,500

University of Pennsylvania
Support for Frontiers in Reproduction training course, at the Marine Biological Laboratory
Approved \$5,000 Paid \$5,000

SUBTOTAL
Approved \$362,500 Paid \$17,500

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TOTAL REPRODUCTIVE SCIENCE
Approved \$1,990,500 Paid \$194,000

INTERFACES BETWEEN THE PHYSICAL/CHEMICAL/ COMPUTATIONAL SCIENCES AND THE BIOLOGICAL SCIENCES

California Institute of Technology
Program in computational molecular biology
Scott E. Fraser, Ph.D.
Michael L. Roukes, Ph.D.
Approved \$2,500,000 Paid \$500,000

Florida State University Research Foundation Inc.
Program in mathematics and molecular biology
(Multi-university, interdisciplinary national research
and training consortium composed of 17 laboratories
representing 12 institutions)
DeWitt L. Sumners, Ph.D.
Florida State University
Sylvia J. Spengler, Ph.D.
University of California-Berkeley
Approved \$2,500,000 Paid \$500,000

Regents of the University of California
LaJolla interfaces in science training program
(Consortium of the University of California-San Diego,
the Scripps Research Institute, the Salk Institute for
Biological Research, and the San Diego Supercomputing
Center)

Elizabeth D. Getzoff, Ph.D.
Scripps Research Institute
Jose N. Onuchic, Ph.D.
University of California-San Diego
Approved \$2,500,000 Paid \$437,500

Rockefeller University
Interdisciplinary graduate and postdoctoral training
program in physics, chemistry, and biology
Stephen K. Burley, M.D., D.Phil.
Albert Libchaber, Ph.D.
Approved \$2,500,000 Paid \$384,000

SUBTOTAL
Approved \$10,000,000 Paid \$1,821,500

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**TOTAL INTERFACES BETWEEN THE PHYSICAL/CHEMICAL/COMPUTATIONAL
SCIENCES AND THE BIOLOGICAL SCIENCES**
Approved \$10,000,000 Paid \$1,821,500

SCIENCE EDUCATION

Student Science Enrichment Program

Appalachian State University
*Science and technology skill building for female students
and their female teachers*
Paid \$62,578

Catawba Science Center Inc.
Circle of support
Approved \$129,639 Paid \$42,000

Chowan College
Science enrichment program
Approved \$105,000 Paid \$35,000

Cumberland County Schools
Cape Fear high school science academy
Paid \$28,208

Duke University
Talent identification program
Paid \$60,000

Durham Academy
Durham public schools summer institute
Paid \$30,000

Grey Culbreth Middle School
*Seeking environmental awareness researching Chapel
Hill (SEARCH)*
Paid \$20,000

North Carolina Aquarium on Roanoke Island
North Carolina Aquarium Society
A mentor-learner approach to science enrichment
Approved \$179,837 Paid \$60,000

North Carolina Museum of Life and Science
Building the science ladder
Paid \$58,918

North Carolina State Museum of Natural Sciences
Girls in science
Paid \$19,570

North Carolina State University
Science and mathematics colloquies at Science House
Approved \$163,425 Paid \$58,911

Pines of Carolina Girl Scout Council
Science enrichment program
Approved \$171,700 Paid \$53,500

Science STARS Universe
Wake Forest University
A universe of possibilities
Paid \$51,000

SciWorks
Science in the city
Paid \$59,938

Shodor Education Foundation Inc.
*Stimulating understanding of computational science
through collaboration, exploration, experiment, and
discovery (SUCCEED)*
Approved \$176,930 Paid \$60,000

University of North Carolina-Chapel Hill
Adventures in biomolecular sciences
Approved \$150,120 Paid \$50,040

University of North Carolina Mathematics
and Science Education Network
University of North Carolina-Chapel Hill
Pre-college exploring science program
Paid \$60,000

University of North Carolina-Wilmington
Cape Fear science camp
Approved \$111,449 Paid \$33,877

University of North Carolina-Wilmington
*Oceanographic field support for summer ventures
in science and mathematics*
Paid \$9,450

SUBTOTAL
Approved \$1,188,100 Paid \$852,990

Wellcome Visiting Professorships in the Basic Medical Sciences

Titles of Wellcome Lectures cited if given in fiscal year 1996-97.

Case Western Reserve University School of Medicine
Ernesto Carafoli, Ph.D.
Swiss Federal Institute of Technology
The calcium pump of the plasma membrane: recent progress and future perspectives
Paid \$5,000

East Carolina University School of Medicine
Medical Foundation of East Carolina University
Alan C. Sartorelli, Ph.D.
Yale University School of Medicine
Approved \$5,000

Greenwood Genetic Center
Kathleen K. Sulik, Ph.D.
University of North Carolina-Chapel Hill
Approved \$5,000

Harvard Medical School
Janice G. Douglas, M.D.
Case Western Reserve University School of Medicine
Racial/ethnic differences in the pathophysiology of essential hypertension: treatment implications
Paid \$5,000

Indiana University School of Medicine
Indiana University Foundation
Joseph Schlessinger, Ph.D.
New York University School of Medicine
Signaling by tyrosine phosphorylation
Paid \$5,000

Johns Hopkins University
Eli E. Sercarz, Ph.D.
University of California-Los Angeles
Approved \$5,000

Louisiana State University
Pennington Biomedical Research Center
John Todd, Ph.D.
Wellcome Trust Centre for Human Genetics
Etiology and genetics of type I diabetes
Paid \$5,000

Loyola University Medical Center
David L. Felten, M.D., Ph.D.
University of Rochester
Direct neural connections with organs of the immune system: a functional and structural basis for mind-body interactions
Paid \$5,000

Marshall University School of Medicine
Marshall University Research Corporation
Gerald B. Grunwald, Ph.D.
Jefferson Medical College
A century of cell adhesion: from the blastomere to the clinic
Paid \$5,000

Medical University of South Carolina
Alexander Rich, M.D.
Massachusetts Institute of Technology
Approved \$5,000

Meharry Medical College
Bertil Hille, Ph.D.
University of Washington School of Medicine
Approved \$5,000

Meharry Medical College
Vinay Kumar, M.D., M.B.B.S.
University of Texas Southwestern Medical School
Mechanisms of recognition by natural killer cells
Paid \$5,000

Morehouse School of Medicine
Stephen B. Liggett, M.D.
University of Cincinnati College of Medicine
Approved \$5,000

New York Medical College
David G. Harrison, M.D.
Emory University School of Medicine
Approved \$5,000

New York Medical College
Stanley G. Nathenson, M.D.
Albert Einstein College of Medicine
Approved \$5,000

New York University
Wilma K. Olson, Ph.D.
Rutgers, The State University of New Jersey
Computer models of DNA folding
Paid \$5,000

New York University Medical Center
Donald M. Bers, Ph.D.
Loyola University Chicago
Temporal micro-domains of intra-cellular Ca (Ca sparks) in heart cells: significance and functional consequences
Paid \$5,000

North Dakota State University

Richard J. Grand, M.D.

New England Medical Center

*Impact of chronic disease (cystic fibrosis, Crohn's disease):
methods of assessment, and nutritional therapy for
restitution of intake and make-up growth*

Paid \$5,000

Northeast Louisiana University College of Pharmacy
and Health Sciences

Sidney D. Nelson, Ph.D.

University of Washington School of Pharmacy

Approved \$5,000

Northeast Louisiana University College of Pharmacy
and Health Sciences

Sten Orrenius, M.D.

Karolinska Institute

*Apoptosis: pathophysiology and regulatory mechanisms
of programmed cell death*

Paid \$5,000

Northwestern University Medical School

Ricardo Miledi, M.D.

University of California-Irvine

Brain serotonin receptors

Paid \$5,000

Rutgers, The State University of New Jersey-Newark

Fred H. Gage, Ph.D.

Salk Institute for Biological Sciences

Approved \$5,000

Rutgers, The State University of New Jersey-Piscataway

Zippora Shakked, Ph.D.

Weizmann Institute for Science

Approved \$5,000

St. Louis University Health Science Center

Jack Gorski, Ph.D.

University of Wisconsin-Madison

Estrogen receptor interaction with specific DNA sequences

Paid \$5,000

Stanford University School of Medicine

Jerry R. McGhee, Ph.D.

University of Alabama-Birmingham

Novel molecular adjuvants for mucosal vaccines

Paid \$5,000

University of Alabama-Birmingham School of Medicine

Joel M. Kremer, M.D.

Albany Medical Center

Nutrition and rheumatic diseases

Paid \$5,000

University of Arkansas for Medical Sciences

John P. Fraher, Ph.D., D.Sc.

University College

*Partitioning the nervous system: glial barriers in
development and regeneration*

Paid \$5,000

University of California-San Francisco

Regents of the University of California

Alan R. Fersht, Ph.D.

University of Cambridge

Approved \$5,000

University of Chicago

David Baltimore, Ph.D.

Massachusetts Institute of Technology

Choosing life or death in cells

Paid \$5,000

University of Georgia

University of Georgia Research Foundation

John W. Erdman Jr. Ph.D.

University of Illinois-Urbana/Champaign

Approved \$5,000

University of Maryland

David W. Rice, D. Phil.

University of Sheffield

Approved \$5,000

University of Massachusetts Medical School

Ronald M. Evans, Ph.D.

Salk Institute for Biological Studies

Approved \$5,000

University of Medicine and Dentistry of New Jersey

Peter B. Dervan, Ph.D.

California Institute of Technology

Approved \$5,000

University of Missouri-Columbia

Curators of the University of Missouri

Christine E. Seidman, M.D.

Jonathan G. Seidman, Ph.D.

Harvard Medical School

Approved \$5,000

University of Nebraska Medical Center

Ronald M. Evans, Ph.D.

Salk Institute for Biological Studies

*Role of nuclear receptors in human disease and the
molecular genetics of nuclear receptor signaling*

Paid \$5,000

University of New Mexico School of Medicine
Eugene C. Butcher, M.D.
Stanford University Medical Center
Lymphocyte homing: combinatorial and development mechanisms targeting the immune response
Paid \$5,000

University of North Carolina-Chapel Hill
Susan S. Taylor, Ph.D.
University of California-San Diego
Approved \$5,000

University of North Dakota School of Medicine
and Health Sciences
Jan Alexander, M.D., Ph.D.
National Institute of Public Health
Heterocyclic amines from cooked meat: biological fate and role in colon carcinogenesis
Paid \$5,000

University of North Dakota School of Medicine
and Health Sciences
John R. Hassell, Ph.D.
University of Pittsburgh
Approved \$5,000

University of Oklahoma Health Sciences Center
Phyllis M. Wise, Ph.D.
University of Kentucky College of Medicine
The "menopause": a window into the aging brain
Paid \$5,000

University of Pittsburgh School of Medicine
Steven C. Hebert, M.D.
Harvard Medical School
Molecular basis of renal iron transport and sensing
Paid \$5,000

University of Puerto Rico School of Medicine
Walter C. Willett, M.D., Ph.D.
Harvard School of Public Health
Diet and health: what do we know?
Paid \$5,000

University of Rochester Medical School
University of Rochester Cancer Center
Thomas J. Schall, Ph.D.
DNAX Research Institute
Approved \$5,000

University of South Alabama College of Medicine
John V. Weil, M.D.
University of Colorado Health Sciences Center
Pulmonary vascular injury in sickle cell disease
Paid \$5,000

University of South Dakota School of Medicine
Eric N. Olson, Ph.D.
University of Texas Southwestern Medical Center-Dallas
Approved \$5,000

University of South Florida College of Medicine
University of South Florida Foundation
Gavril W. Pasternak, M.D., Ph.D.
Memorial Sloan-Kettering Cancer Center
Molecular biology of opioid behavior
Paid \$5,000

University of Texas-Houston Health Science Center
Tom Curran, Ph.D.
St. Jude Children's Research Hospital
Approved \$5,000

University of Texas Medical Branch-Galveston
Agnes B. Kane, M.D., Ph.D.
Brown University
Approved \$5,000

University of Utah
Cecil B. Pickett, Ph.D.
Schering-Plough Research Institute
Approved \$5,000

University of Vermont College of Medicine
Robert J. P. Williams, D.Phil.
University of Oxford
The chemistry of the evolution of life: an account of the way in which the Earth's chemistry has changed
Paid \$5,000

University of Wyoming
Jack L. Strominger, M.D.
Harvard University
Approved \$5,000

Virginia Polytechnic Institute and State University
Virginia Tech Foundation Inc.
Helmut Beinert, Ph.D.
University of Wisconsin-Madison
Iron-sulfur clusters: nature's modular multi-purpose structures
Paid \$5,000

Washington State University
Ian F. C. McKenzie, M.D., Ph.D.
Austin Research Institute
Approved \$5,000

Washington State University College of Pharmacy
Ronald T. Borchardt, Ph.D.
University of Kansas School of Pharmacy
Approved \$5,000

Wayne State University School of Medicine
Piet Borst, M.D., Ph.D.
Netherlands Cancer Institute
Approved \$5,000

Wayne State University School of Medicine
Timothy A. Springer, Ph.D.
Harvard Medical School
The multi-step model of leukocyte extravasation for eosinophils
Paid \$5,000

Federation of American Societies
for Experimental Biology
Administrative expenses for Wellcome Visiting Professorships in the Basic Medical Sciences
Approved \$8,873 Paid \$8,873

SUBTOTAL
Approved \$148,873 Paid \$148,873

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Wellcome Visiting Professorships in the Microbiological Sciences

Titles of Wellcome Lectures cited if given in fiscal year 1996-97.

Florida International University
Valerie J. Smith, Ph.D.
University of Saint Andrews
Approved \$5,000

Pittsburg State University
Ralph S. Tanner, Ph.D.
University of Oklahoma
Approved \$5,000

Georgia Southern University
Georgia Southern University Foundation Inc.
Masahito Fukunaga, Ph.D.
Fukuyama University Faculty of Pharmacy
Approved \$5,000

St. Cloud State University
St. Cloud State University Foundation
Jill E. Clarridge, Ph.D.
Veterans Affairs Medical Center-Houston
Approved \$5,000

Medical College of Wisconsin
J. Michael Bishop, M.D.
University of California-San Francisco School of Medicine
Cancer: the rise of the genetic paradigm
Paid \$5,000

Southern University-Baton Rouge
Paul S. Miller, Ph.D.
Johns Hopkins University School of Hygiene
and Public Health
Approved \$5,000

North Carolina A&T State University
Kenneth Reid, Ph.D.
University of Oxford
Roles of mammalian lectins in innate immunity
Paid \$5,000

University of South Dakota School of Medicine
Gail H. Cassell, Ph.D.
Eli Lilly Research Laboratories
Emerging infectious diseases
Paid \$5,000

Pembroke State University
Alexander McPherson, Ph.D.
University of California-Riverside
Why conduct experiments in space?
Paid \$5,000

University of Utah School of Medicine
Staffan Normark, M.D., Ph.D.
Karolinska Institute
Microbial interaction strategies
Paid \$5,000

SUBTOTAL
Approved \$25,000 Paid \$25,000

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Other Grants

In addition to its competitive awards, BWF makes noncompetitive grants for activities that are closely related to its major focus areas. These grants are intended to enhance the general environment for research in the targeted area.

Francis Marion University

Support for students to attend program for young scholars

Approved \$3,000 Paid \$3,000

Medical Research Council of Canada

Support for students in Canadian schools of medicine, dentistry, and pharmacy to engage in short-term research projects

Paid \$500,000

National Academy of Sciences

Support for the educational series Beyond Discovery: the Path from Research to Human Benefit

Approved \$50,000 Paid \$50,000

North Carolina Museum of Life and Science

Support for annual regional science museum education conference for five years

Approved \$25,000 Paid \$25,000

North Carolina School of Science and Mathematics

Support for Education Future Center

Approved \$70,336

North Carolina State University

North Carolina Textile Foundation

Support for National Science Olympiad

Approved \$10,000 Paid \$10,000

Public School Forum of North Carolina

Support for educational efforts in lieu of honorarium for Gail Morse, a member of the science education advisory committee

Approved \$2,500 Paid \$2,500

Public School Forum of North Carolina

Support for Institute for Educational Policy Makers, a group devoted to enhancing the educational policymaking capacity of elected state and local officials in North Carolina

Approved \$250,000

Public School Forum of North Carolina

Support for Institute for Educational Policy Makers

Approved \$30,000 Paid \$30,000

United Negro College Fund

Support for educational efforts in lieu of honorarium for Dr. Elmira Johnson, a member of the science education advisory committee

Approved \$2,500 Paid \$2,500

University of North Carolina-Chapel Hill

Support for educational conference on sickle cell syndrome and related genetic disorders

Approved \$2,500 Paid \$2,500

University of North Carolina-Chapel Hill

Support for expansion and revitalization of the M.D./Ph.D. program

Approved \$50,000 Paid \$50,000

University of North Carolina Mathematics and Science Education Network

Support for 10th anniversary celebration of the network's pre-college program

Approved \$500 Paid \$500

Wake Forest University

Bowman Gray School of Medicine

Support for oncology geriatric education retreat

Paid \$3,000

Worcester Foundation for Experimental Biology

Support for K-12 science education program

Paid \$50,000

SUBTOTAL

Approved \$496,336 Paid \$729,000

TOTAL SCIENCE EDUCATION

Approved \$1,858,309 Paid \$1,755,863

ENVIRONMENT FOR SCIENCE

Additional grants made through this program are listed in the previous sections under "Other Grants."

General

American Association for the Advancement of Science
Support for Center for Science, Technology, and Congress
 Approved \$150,000 Paid \$75,000

Anne Arundel Hospice
Support for donation in memory of William Dowling, former BWF Director
 Approved \$500 Paid \$500

Aspen Center for Physics
Support for workshop on identifying patterns in biological sequences
 Approved \$2,500 Paid \$2,500

Association of Military Surgeons of the United States
Support for Sir Henry Wellcome Medal and Prize
 Paid \$3,957

Association of Military Surgeons of the United States
Support for Sir Henry Wellcome Medal and Prize
 Approved \$10,000 Paid \$5,433

Council on Foundations
Support for general activities
 Approved \$35,000 Paid \$35,000

Foundation Center
Support for general activities
 Approved \$5,000 Paid \$5,000

Foundation Center
Support for project to redesign the organization's database
 Approved \$20,000 Paid \$20,000

Friends of the National Library of Medicine
Support for Library of Medicine to improve access to medical and scientific information at medical education centers nationwide
 Approved \$5,000 Paid \$5,000

Grantmakers in Health
Support for general activities
 Approved \$5,000 Paid \$5,000

Grantmakers in Health
Support for general activities
 Approved \$5,000 Paid \$5,000

Harvard Medical School
 Children's Hospital
Support for symposium honoring Dr. Mary Ellen Avery, BWF board member, and for the Avery fellowship for women
 Approved \$20,000 Paid \$20,000

Harvard School of Public Health
Support for forum on Gateways to World Health: New Science and Strategies in Public Health
 Paid \$10,000

Institute of Medicine
 National Academy of Sciences
Support for Graduate Medical Education Trust Fund study
 Approved \$25,000 Paid \$25,000

National Academy of Sciences
Support for distribution of the report On Being an Advisor or Mentor
 Approved \$10,494 Paid \$10,494

National Trust for Historic Preservation
Support for erecting Wisconsin state historical marker for Sir Henry Wellcome
 Approved \$2,000 Paid \$2,000

New York Academy of Medicine
Support for David E. Rogers Fellowship for medical students
 Approved \$5,000 Paid \$5,000

North Carolina Center for Nonprofits
Support for general activities
 Approved \$500 Paid \$500

North Carolina Governor's Institute on Alcohol and Substance Abuse
Support for Young Investigator Awards Program
 Paid \$37,600

Research!America
Support for pilot phase of the 435 Project
 Approved \$25,000 Paid \$25,000

Sigma Xi
Support for young scientists to attend 1997 forum on Industrial Innovation: Industry Perspectives and Policy Implications
 Approved \$5,000 Paid \$5,000

Society for the Advancement of Women's Health Research
Support for general activities
Approved \$5,000 Paid \$5,000

Southeastern Council of Foundations
Support for general activities
Approved \$3,500 Paid \$3,500

University of Arizona College of Pharmacy
Support for endowed chair in the name of Dr. Howard J. Schaeffer
Approved \$1,691,800 Paid \$1,691,800

University of North Carolina-Chapel Hill School
of Public Health
*Support for scholarship fund in honor of the school's
dean, Dr. Michel Ibrahim*
Approved \$5,000 Paid \$5,000

SUBTOTAL
Approved \$2,036,294. Paid \$2,008,284

Communications

American Association for the Advancement of Science
Support for EurekAlert!
Approved \$40,000 Paid \$40,000

American Association for the Advancement of Science
*Support for Mass Media Science and Engineering
Fellows Program*
Approved \$15,000 Paid \$15,000

American Association for the Advancement of Science
Support for Science's Next Wave
Paid \$250,000

Council for Advancement of Science Writing
*Support for 1997 New Horizons in Science Briefing and
travel fellowships*
Approved \$30,000 Paid \$30,000

Sigma Xi
Support for Media Resource Service
Paid \$50,000

Sigma Xi
Support for television documentary on Dr. Gertrude Elion
Paid \$30,000

SUBTOTAL
Approved \$85,000 Paid \$415,000

History of Medicine

BWF 40TH ANNIVERSARY ONE-TIME AWARDS

Jeffrey P. Baker, M.D., Ph.D.
Duke University School of Medicine
History of childhood immunizations in the United States
Paid \$48,722

Allan M. Brandt, Ph.D.
Harvard Medical School
President and Fellows of Harvard College
*The art and science of medicine: essays in the history
of the doctor-patient relationship*
Paid \$50,000

Joel T. Braslow, M.D., Ph.D.
University of California-Los Angeles
Regents of the University of California
*A history of antipsychotic drug use in clinical practice,
1954-70*
Paid \$53,764

Alberto Cambrosio, Ph.D.
McGill University
*New biomedical technologies and the transformation
of hematology and clinical immunology, 1960-present*
Paid \$45,000

Ann G. Carmichael, M.D., Ph.D.
Indiana University
The power of past plagues
Paid \$36,000

Peter English, M.D., Ph.D.
Duke University School of Medicine
History of rheumatic fever
Paid \$64,160

John M. Eyler, Ph.D.
University of Minnesota
After the magic bullet: infectious disease epidemiology in America since penicillin
Paid \$90,000

Georgina Feldberg, Ph.D.
Molly Ladd-Taylor, Ph.D.
Alison I. Li, Ph.D.
Kathryn McPherson, Ph.D.
York University
Women, science, and medicine in post-war North America, comparative Canadian-American perspectives, 1940-80
Paid \$118,000

Vanessa N. Gamble, M.D., Ph.D.
University of Wisconsin-Madison
Board of Regents-University of Wisconsin
Black women physicians in the 20th century
Paid \$47,632

Joel D. Howell, M.D., Ph.D.
University of Michigan
Regents of University of Michigan
Making modern medicine: technology and U.S. health care, 1925-55
Paid \$75,553

Margaret Humphreys, M.D., Ph.D.
Duke University Medical Center
The pestilence that stalks in darkness: a history of malaria in the United States
Paid \$39,693

Judith W. Leavitt, Ph.D.
University of Wisconsin-Madison
Board of Regents-University of Wisconsin
Health care at home during the antibiotic transition: mothers, physicians, and children, 1930-55
Paid \$47,638

Barron H. Lerner, M.D., Ph.D.
Columbia University
Trustees of Columbia University
Inventing a preventable disease: a social history of prostate cancer in the 20th century
Paid \$39,966

M. Susan Lindee, Ph.D.
University of Pennsylvania
Trustees of the University of Pennsylvania
The rise of genetic disease: medical and institutional interpretations of heredity in post-war America
Paid \$61,400

Howard Markel, M.D., Ph.D.
University of Michigan Medical School
Regents of University of Michigan
American health-care providers and foreign born patients: study of health-care policies and delivery for Russian-Jewish, Mexican, and Chinese immigrants
Paid \$60,733

Harry M. Marks, Ph.D.
Johns Hopkins University
Medical progress in the 20th century: a historical and quantitative inquiry
Paid \$78,804

Martin S. Pernick, Ph.D.
University of Michigan
Regents of University of Michigan
Changing meanings of death in 20th century America: from the fear of premature burial to the construction of brain death
Paid \$63,078

Jack D. Pressman, Ph.D.
University of California-San Francisco
The evolution of biomedical science, 1930-60
Paid \$43,000

Maria Trumpler, Ph.D.
Yale University School of Medicine
Representation of the sodium channel molecule, 1970-90
Paid \$46,250

Keith Wailoo, Ph.D.
University of North Carolina-Chapel Hill School of Medicine
Science, politics, and child health in America: cystic fibrosis and sickle cell anemia in historical perspective
Paid \$31,000

John H. Warner, Ph.D.
Yale University School of Medicine
The transformation of the hospital patient record in the United States
Paid \$69,053

George Weisz, Ph.D.
McGill University
Medical specialization in comparative perspective
Paid \$60,000

AD HOC GRANTS

American Association for the History of Medicine
Support for association's 1997 annual meeting
Approved \$1,500 Paid \$1,500

American Association for the History of Medicine
*Support for the Jack Pressman-Burroughs Wellcome
Fund career development award in 20th century history
of medicine or science*
Approved \$43,000

Russell Maulitz, M.D., Ph.D.
Allegheny University of the Health Sciences
*Support for conversion of the Surgeon General's
Index-Catalogue (1880-1936) to CD-ROM*
Approved \$65,000 Paid \$65,000

SUBTOTAL

Approved \$109,500 Paid \$1,335,946

Inactive Programs—Active Awardees of Former Programs

EPILEPSY FELLOWSHIPS

*These awards are administered in partnership with
the Epilepsy Foundation of America. BWF awards the
primary grant to the foundation, which distributes the
funds to the individual awardees.*

William J. Marks Jr., M.D.
University of California-San Francisco
*Evaluation of cerebral metabolic status in primary
generalized epilepsy*
Paid \$15,000

Jack Parent, M.D.
University of California-San Francisco
*Axonal guidance molecules in the hippocampus: effects
on cultured dentate granule cells*
Paid \$15,000

Nicholas P. Poolos, M.D., Ph.D.
Baylor College of Medicine
*Imaging epileptiform activity in hippocampal pyramidal
cells in vitro*
Approved \$30,000 Paid \$15,000

FELLOWSHIPS IN SEXUALLY TRANSMITTED DISEASES

*These awards are administered in partnership with
the American Social Health Association. BWF awards
the primary grant to the association, which distributes
the funds to the individual awardees.*

Susan P. Dias, M.D. (1996-98)
Denver Public Health
*Studies to enhance cost-effectiveness for treatment
of genital Chlamydia trachomatis infections*
Paid \$15,469

American Social Health Association
Support for 1997 fellowship recipient
Approved \$30,937

HITCHINGS AWARDS FOR INNOVATIVE METHODS IN DRUG DESIGN

Jonathan A. Ellman, Ph.D.
University of California-Berkeley
Regents of the University of California
Combinatorial strategies for drug development
Paid \$87,500

HITCHINGS-ELION TRUST FELLOWSHIPS

Peter D. Burbelo, Ph.D.
Georgetown University Medical Center
*The functions of effector kinases and non-kinases
for rho GTPases*
Approved \$807 Paid \$4,557

Barry J. Hardy, Ph.D.
Wesleyan University
*Understanding the molecular interactions involved in
the recognition of carbohydrate molecules by proteins*
Approved \$3,507 Paid \$3,750

Michael Tilley, Ph.D.
Kansas State University
Acquired immunity to Cryptosporidium infection
Approved \$3,000

INFECTIOUS DISEASES FELLOWSHIPS

These awards are administered in partnership with the Infectious Diseases Society of America. BWF awards the primary grant to the society, which distributes the funds to the individual awardees.

Sandy Sallustio, M.D., Ph.D.

Unipolar localization of IcsA, a protein essential to Shigella pathogenesis

Approved \$1,590

NEW INVESTIGATOR AWARDS IN VIROLOGY

These awards are administered in partnership with the Infectious Diseases Society of America. BWF awards the primary grant to the society, which distributes the funds to the individual awardees.

Betsy Herold, M.D.

University of Chicago

Herpes simplex viruses infections

Paid \$31,500

Jeffery L. Meier, M.D.

University of Iowa College of Medicine

Mechanisms governing human cytomegalovirus latency

Paid \$31,500

Patricia L. Winokur, M.D.

University of Iowa

Functional analysis of mutations in the human papillomavirus E2 protein

Paid \$15,750

SCHOLAR AWARDS IN IMMUNOPHARMACOLOGY

These awards are administered in partnership with the American Academy of Allergy and Immunology. BWF awards the primary grant to the academy, which distributes the funds to the individual awardees.

Jonathan P. Arm, M.D.

Harvard Medical School

Brigham and Women's Hospital

Structure and function of GP49, a novel member of the immunoglobulin superfamily, expressed on mast cells and monocytes

Paid \$70,000

Thomas P. Atkinson, M.D., Ph.D.

University of Alabama-Birmingham

Regulation of phospholipase C by the IgE receptor on mast cells

Paid \$70,000

Bruce S. Bochner, M.D.

Johns Hopkins University School of Medicine

Johns Hopkins Asthma and Allergy Center

Mechanisms of eosinophil and basophil recruitment in human allergic diseases

Paid \$17,500

YOUNG INVESTIGATOR AWARDS IN PHARMACOKINETICS, PHARMACODYNAMICS, AND DRUG METABOLISM

These awards are administered in partnership with the American Association of Pharmaceutical Scientists. BWF awards the primary grant to the association, which distributes the funds to the individual awardees.

Deanna L. Kroetz, Ph.D.

University of California-San Francisco

Regulation of the cytochrome P450 4A-mediated metabolism of fatty acids

Approved \$1,055 Paid \$55

SUBTOTAL

Approved \$70,896 Paid \$392,581

TOTAL ENVIRONMENT FOR SCIENCE

Approved \$2,301,690 Paid \$4,151,811

Information for Applicants

The Burroughs Wellcome Fund makes approximately 90 percent of its grants through competitive award programs, which support investigators in targeted areas of basic scientific research that have relevance to human health. Most of the award programs are open to scientists who are citizens or permanent residents of the United States and Canada. A few programs are open only to U.S. scientists, as noted in the program descriptions that follow. Awards are made with the advice of BWF's advisory committees, which are composed of scientists and educators selected for their expertise in the program areas. Program application deadlines for the 1999 award cycle are listed on page 74.

Most awards are made only to degree-granting institutions on behalf of individual researchers, who must be nominated by their institution. All institutions receiving awards must be tax-exempt 501(c)(3) organizations. Government agencies, such as the National Institutes of Health and the Centers for Disease Control and Prevention, are not eligible for awards.

BWF does not support activities that are primarily clinical in nature (such as disease diagnosis and treatment) or primarily related to health care and health care policy. The Fund generally does not provide support for research projects or other activities outside its competitive programs, nor does it generally support endowments, development campaigns, ordinary operating expenses, capital facilities and equipment, or publications.

TO OBTAIN INFORMATION ABOUT PROGRAMS

Burroughs Wellcome Fund
4709 Creekstone Drive, Suite 100
Durham, NC 27703
Telephone: (919) 991-5100
Fax: (919) 941-5884

Information about BWF and its award programs can be obtained electronically by sending an e-mail message to mailback@bwfund.org—type the word “menu” on the subject line for a list of programs. To request a specific program brochure to be delivered by regular mail, or to send a message to a BWF program officer, access the Fund at info@bwfund.org.

Program information is available on BWF's website at <http://www.bwfund.org>

AWARD PROGRAMS

Career Development

Career Awards in the Biomedical Sciences

Awards foster the development and productivity of outstanding biomedical researchers who are early in their careers, to help them make the critical transition to becoming independent investigators. It is expected that by the end of the award, recipients will be engaged in productive research programs and will be able to compete effectively for support from government and other extramural sources. The competitive awards provide support ranging from \$412,500 for four years to \$532,400 for six years to fund the advanced postdoctoral years and the first three years of faculty service. All recipients must complete at least one year of postdoctoral training as part of the award. Recipients may spend part of the award at an institution in the United Kingdom or Ireland. It is anticipated that at least 18 awards will be made annually. Awards specifically targeted for reproductive science will be included. Half of the awards will go to individuals with a Ph.D. degree in one of the biomedical sciences, and half will go to individuals with an M.D. or M.D./Ph.D. degree. Candidates must have completed at least 12 months but not more than 48 months of postdoctoral research training by the application deadline; no exceptions to this requirement will be made. For candidates with M.D. degrees, postdoctoral training excludes clinically oriented residencies that do not contain a major research component. Individuals who hold a faculty appointment as an assistant professor or the equivalent, or who know they will hold such an appointment within a year of the application deadline, are not eligible.

Hitchings-Elion Fellowships

Fellowships provide support for five years to enable postdoctoral scientists to undertake research training in the United Kingdom or Ireland and begin faculty service in the United States or Canada. Grants provide \$315,000 to support two postdoctoral years abroad, a transitional year to complete training in the United Kingdom or Ireland or to return to North America for a year of postdoctoral training, and two faculty years. The awards are intended to help scientists early in their careers become independent investigators and to promote collaboration among scientists in the countries involved. It is anticipated that up to five fellowships will be awarded annually. Candidates must hold, or expect to hold by the time the fellowships are awarded, a doctoral degree in one of the medical, biomedical, veterinary, or behavioral sciences, and they must generally have less than two years of post-

doctoral training by the application deadline. Proposals in the behavioral sciences must have biomedical relevance. U.K. host institutions may include universities, medical or veterinary schools, scientific institutes, and government laboratories, but not industrial laboratories. Scientists currently working in a U.K. laboratory are not eligible. Fellows are not required to return to the same institution they were affiliated with prior to the award.

Life Sciences Research Fellowships

Fellowships provide \$105,000 over three years for U.S. postdoctoral scientists pursuing research careers in the life sciences. It is anticipated that three awards will be made annually. These fellowships are administered in partnership with the Life Sciences Research Foundation; contact the foundation for application materials (609/258-3551).

Wellcome Research Travel Grants (Including History of Medicine)

Grants enable established researchers to visit colleagues in the United Kingdom or Ireland in order to exchange scientific information or learn new research techniques. Grant submissions in the basic biomedical sciences, clinical research, and the history of medicine are eligible. Visits may last from two weeks to six months. The grants are intended to facilitate the rapid exchange of knowledge in order to advance medical science and the field of medical history. It is anticipated that approximately 40 research travel grants and up to 10 history of medicine travel grants will be made annually. The award consists of travel expenses and subsistence allowance for the grantee; grants average approximately \$6,000 (range: \$1,000 to \$15,000). Funds to cover economy airfare for one return trip to the grantee's home institution may be available to facilitate academic or clinical continuity during longer visits (five to six months). Candidates must hold a medical or scientific doctoral degree; must be full-time researchers in the biomedical sciences or in the history of medicine or science; and must be employed by a degree-granting institution, generally at the level of assistant professor or above. Travel grants are made when other funds are not available or are insufficient; grants are not intended to support graduate and medical students, postdoctoral research training, travel taken solely for educational purposes, or travel to attend international meetings. BWF will make its selections and notify applicants within two months of the application deadlines.

Emerging Infectious Diseases

Scholar Awards and New Investigator Awards in Molecular Parasitology

Scholar awards provide \$400,000 over five years, and new investigator awards provide \$195,000 over three years. It is anticipated that two scholar awards and four new investigator awards will be made annually. The awards are intended to foster the development and productivity of scientists who will bring new ways of thinking and new experimental approaches to the study of parasitic diseases, which have been relatively neglected as targets for basic research. BWF is interested particularly in supporting investigators who will move modern molecular techniques into the study of parasitic systems, and whose work will extend the study of parasites in new directions, rather than simply continue the current directions in parasitology. Parasitic diseases include but are not limited to malaria, trypanosomiasis, filariasis, schistosomiasis, leishmaniasis, toxoplasmosis, and amebiasis. Candidates for both types of awards must have an M.D. or Ph.D. degree and be established independent investigators. Candidates for scholar awards must be at the associate professor level or its tenure-track equivalent. Consideration also will be given to senior investigators who are significantly reorienting their research from another field to molecular parasitology. Candidates for new investigator awards must be at the assistant professor level or its tenure-track equivalent. Researchers just appointed to a tenure-track position often will not yet have demonstrated a sufficient track record to be competitive for this award.

New Initiatives in Malaria Research

Two types of awards are offered. One type provides \$100,000 over two years, and is intended to support either feasibility studies and pilot work that will underpin higher-risk projects in malaria or investigators from other fields who are reorienting their research to malaria. The second type provides up to \$400,000 over four years, and is intended to support longer-term studies that bring new ways of thinking and new experimental approaches to malaria research. It is anticipated that up to \$1 million will be spent annually on awards, with the split between two-year and four-year awards to be determined during the selection process. The awards are intended to attract

more investigators to work on malaria, to encourage them to bring novel approaches to studying the pathogens and arthropod vectors responsible for causing the disease, and to enhance scientific collaborations between investigators at the same or different institutions. Candidates must have an M.D. or Ph.D. degree and hold a tenure-track faculty appointment or similar tenure-track position. Applications from co-investigators with complementary expertise to work jointly on research are encouraged. Experience in malaria research is not a prerequisite. BWF seeks to encourage individuals from other fields to apply their expertise in bringing new ideas and approaches to the study of malaria.

Scholar Awards and New Investigator Awards in Molecular Pathogenic Mycology

Scholar awards provide \$400,000 over five years, and new investigator awards provide \$195,000 over three years. It is anticipated that two scholar awards and two new investigator awards will be made. The awards are intended to give recipients the freedom and flexibility to pursue new avenues of inquiry and higher-risk research projects that hold potential for advancing significantly the field of medical mycology. BWF is interested particularly in supporting scientists—including investigators already working in mycology as well as those from other fields—who will use modern techniques from molecular biology, biochemistry, immunology, pharmacology, and genetics to advance fundamental knowledge of virulent fungal pathogens. Candidates for both types of awards must have an M.D. or Ph.D. degree and be established independent investigators. Candidates for scholar awards must be at the late assistant professor level (at least three years into their appointment) or the associate professor level, or they must hold an equivalent tenure-track academic position. Consideration also will be given to senior investigators who are significantly reorienting their research from another field to medical mycology. Candidates for new investigator awards must be at the assistant professor level or hold an equivalent tenure-track academic position. Researchers just appointed to a tenure-track position often will not yet have demonstrated a sufficient track record to be competitive for this award.

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Therapeutic Sciences

New Investigator Awards in the Pharmacological and Toxicological Sciences

This program unites BWF's support for pharmacology and toxicology under a single program, in recognition of the important shared interests of these fields. The program's goal is to foster the development of talented scientists early in their careers who will bring new ways of thinking and new experimental approaches to pharmacology and toxicology. The awards provide \$195,000 over three years. It is anticipated that 10 awards will be made, approximately evenly divided between the pharmacological sciences and the toxicological sciences. The awards are intended to give recipients the freedom and flexibility to engage in higher-risk research that holds potential for moving their respective fields in promising new directions. Candidates have considerable flexibility in proposing research activities, as both pharmacology and toxicology encompass broad areas and are by their very nature multidisciplinary. Candidates must have an M.D. or Ph.D. degree and be independent investigators appointed within three years of the application deadline to a tenure-track position as an assistant professor or its equivalent. Candidates need not have appointments within established programs in pharmacology or toxicology. Indeed, BWF encourages applications from researchers in such diverse departments and fields as biochemistry, genetics, molecular biology, and the physical and computational sciences. Professionals in clinical and veterinary departments who are engaged in fundamental research also are eligible to apply.

Clinical Scientist Awards in Translational Research

This program represents a restructuring of BWF's Scholar Awards in Experimental Therapeutics. The program's goal is to foster the development of outstanding independent physician-scientists who will strengthen translational

research—the two-way transfer between work at the laboratory bench and clinical medicine. The awards provide \$750,000 over five years. It is anticipated that at least eight awards will be made annually. The awards are intended to give recipients the freedom and flexibility to explore fundamental scientific questions, to apply the resulting knowledge at the bedside, and to bring insights from the clinical setting back to the laboratory for further exploration. BWF is interested particularly in supporting investigators who will bring novel ideas and new approaches to translational research. Proposed activities may draw on the many recent advances in the basic biomedical sciences—including such fields as biochemistry, cell biology, genetics, immunology, molecular biology, and pharmacology—that provide a wealth of opportunities for studying and alleviating human disease. Candidates generally must hold an appointment at an accredited medical school at the time of application; candidates from institutions other than medical schools—including schools of veterinary medicine, public health, and pharmacy—will be considered only if they can demonstrate a plan for coordinating with institutions that provide the patient connection essential for translational research. Candidates must have an M.D. or M.D./Ph.D. degree and hold an appointment or joint appointment in a subspecialty of clinical medicine. In exceptional circumstances, non-M.D. candidates will be considered if their work is likely to contribute significantly to the clinical enterprise; these candidates should hold an appointment or joint appointment in a clinical department. Candidates must be tenure-track investigators at the late assistant professor level (at least three years into their appointment) or the associate professor level, or they must hold an equivalent tenure-track academic position. Individuals holding the rank of professor are ineligible.

Reproductive Science

Two of the Career Awards in the Biomedical Sciences are targeted to reproductive science annually. Qualifications for this award are outlined in the "Career Development" section. In addition, BWF supports one postdoctoral fellowship annually for physician-scientists in obstetrics and gynecology. The award, which provides \$144,000 over three years, is administered in partnership with the American Association of Obstetricians and Gynecologists Foundation; contact the foundation for information and application materials (310/206-6632). BWF also provides

partial support, through the Reproductive Scientist Development Program (RSDP), to help U.S. obstetrician-gynecologists working in the basic reproductive sciences bridge the postdoctoral years and initial faculty appointment. RSDP (a consortium supported by the National Institute of Child Health and Human Development, professional societies, and foundations) supports the advanced postdoctoral years, and BWF provides \$240,000 over the first three faculty years. Contact RSDP for information and application materials (415/476-9047).

Interfaces between the Physical/Chemical/Computational Sciences and the Biological Sciences

Awards continue BWF's initiative to encourage the interdisciplinary training of promising graduate and postdoctoral students from the physical, chemical, and computational sciences so they can better apply their unique knowledge and talents to biological problems. Grants of \$350,000 to \$500,000 per year for five years will be made to four to six degree-granting institutions. It is anticipated that grants will be made approximately every two years, with the current round of applications entering the review process in the spring of 1998. The program is not intended to introduce more graduate and postdoctoral students into the research system, but rather to promote a different kind of training and to help break down the traditional barriers among disciplines at academic institutions. Emphasis will be placed on supporting new programs or existing programs that will change graduate and postdoc-

toral training in a meaningful way, as opposed to programs seeking more funding for conventional activities already under way. Institutions can propose graduate or postdoctoral training programs, or a combination of both. Several affiliate organizations within an institution may join together to submit an application. Consortia representing several institutions also may submit applications, so long as one academic institution is prepared to oversee the program and administer the grant. Ancillary activities—such as undergraduate student research programs, faculty seed grants, or invited lectures—may be included as part of the proposal. However, the program's primary emphasis is on promoting the training and research activities of graduate and postdoctoral students, rather than on supporting faculty research projects.

Science Education

Student Science Enrichment Program

Awards, which are limited to nonprofit organizations in BWF's home state of North Carolina, support projects that provide creative science enrichment activities for students in the sixth through twelfth grades who have shown exceptional skills and interest in science, as well as those who may not have had an opportunity to demonstrate conventional "giftedness" in science but are perceived to have high potential. BWF provides approximately \$1 million annually for this program, and awards range from \$60,000 to \$180,000 over three years. The program's goals include expanding students' competence in science, stimulating their curiosities and nurturing their enthusiasm about science, and interesting them in pursuing careers in research or other science-related careers. Projects should enable students to participate in hands-on scientific activities and to pursue inquiry-based avenues of exploration—an educational approach that has proven to be the best way to increase students' understanding and appreciation of the scientific process. Projects may be conducted all year, during the school year, or during the summer. BWF encourages partnerships—for example, between scientific groups and school systems or between universities and community groups. Industries can participate in collaboration with nonprofit organizations that assume the lead role.

Wellcome Visiting Professorships

Professorships enable four-year, degree-granting institutions to bring in distinguished scientists whose interests relate to the basic medical sciences and the microbiological sciences. Professorships in the basic medical sciences are administered in partnership with the Federation of American Societies for Experimental Biology and by the Canadian Federation of Biological Societies. Professorships in the microbiological sciences are administered in partnership with the American Society for Microbiology. Up to 33 awards will be made in the basic medical sciences, including at least five awards to Canadian institutions. Up to five awards will be made in the microbiological sciences, including at least one award to a Canadian institution. Awards provide \$5,000, of which at least \$2,000 must go to the visiting professor. Each visiting professor will spend up to five days at the host institution, where he or she will engage in teaching and discussion with students and faculty. The professor also will deliver a Wellcome Lecture on a subject pertinent to his or her discipline. Applications must be made by an institution wishing to host a visiting professor, not by an individual wishing to visit an institution. Visiting professors may be brought in from outside the United States or Canada. Nominees may come from the academic, government, or private sectors, so long as the nominees are distinguished researchers in their field.

Environment for Science

Grants are intended to support activities focused on improving the environment for research. BWF makes noncompetitive grants for activities that fall outside of its competitive award programs but are closely related to its targeted areas, such as emerging infectious diseases or career development of scientists. The Fund places special priority on working with nonprofit organizations, including government agencies, to leverage financial support for BWF's targeted areas of research, and on encouraging other foundations to support biomedical research. Proposals should be submitted to BWF in the form of a letter, which

should be no more than five pages. Applicants should describe the focus of the activity, the expected outcomes, and the qualifications of the organization or individuals involved; provide certification of the sponsor's Internal Revenue Service tax-exempt status; and give the total budget for the activity, including any financial support obtained or promised. Proposals are given careful preliminary review, and those deemed appropriate are presented for consideration by the Fund's Board of Directors during one of its quarterly meetings.

Program Application Deadlines for 1999 Award Cycle

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Career Development

Career Awards in the Biomedical Sciences
Hitchings-Elion Fellowships
Life Sciences Research Fellowships
Wellcome Research Travel Grants

October 1, 1998
August 1, 1998
October 1, 1998
March 1, July 1,
and November 1
of each year

Emerging Infectious Diseases

Molecular Parasitology Scholar Awards and New Investigator Awards
New Initiatives in Malaria Research
Molecular Pathogenic Mycology Scholar Awards and New Investigator Awards

January 15, 1999
January 15, 1999
January 15, 1999

Therapeutic Sciences

New Investigator Awards in the Pharmacological and Toxicological Sciences
Clinical Scientist Awards in Translational Research

November 1, 1998
November 1, 1998

Reproductive Science

Career Awards in the Biomedical Sciences
Obstetrics and Gynecology Research Fellowships
Reproductive Scientist Development Program Research Grants

October 1, 1998
October 1, 1998
October 1, 1998

Interfaces between the Physical/Chemical/Computational Sciences and the Biological Sciences

To be announced*

Science Education

Student Science Enrichment Program
Wellcome Visiting Professorships in the Basic Medical Sciences
Wellcome Visiting Professorships in the Microbiological Sciences

October 15, 1998
March 1, 1998
March 1, 1998

Environment for Science

Received all year

**It is anticipated that grants will be made approximately every two years, with the current round of applications entering the review process in the spring of 1998.*

Note: If a date falls on a weekend or holiday, the deadline is the next business day.

Advisory Committees

The Burroughs Wellcome Fund uses advisory committees appointed for each competitive award program to review grant applications and make recommendations to its Board of Directors, which makes the final decisions. Members of the advisory committees are selected for their scientific and educational expertise in the program areas.

Career Awards in the Biomedical Sciences

Paul Berg, Ph.D.*

Cahill Professor in Cancer Research
Director, Beckman Center for Molecular and Genetic
Medicine
Stanford University School of Medicine

J. Michael Bishop, M.D.

University Professor of Microbiology and Immunology
Director, G. W. Hooper Research Foundation
University of California-San Francisco Medical Center

Gail H. Cassell, Ph.D. (Co-Chair)

Vice President, Infectious Diseases
Eli Lilly Research Laboratories

Uta Francke, M.D.

Professor of Genetics
Investigator, Howard Hughes Medical Institute
Stanford University School of Medicine

Phil Gold, M.D., Ph.D.

Executive Director, Clinical Research Centre
Montreal General Hospital
Douglas G. Cameron Professor of Medicine
McGill University Faculty of Medicine
Canada

Ashley T. Haase, M.D.

Professor and Chair of Microbiology
University of Minnesota Medical School

Eric R. Kandel, M.D.

University Professor, Center for Neurobiology
and Behavior
Senior Investigator, Howard Hughes Medical Institute
Columbia University

Ernst Knobil, Ph.D.

Ashbel Smith Professor
H. Wayne Hightower Professor in the Medical Sciences
University of Texas-Houston Medical School

I. George Miller, M.D. (Co-Chair)

John F. Enders Professor of Pediatric Infectious Diseases
Yale University School of Medicine

Mary Lou Pardue, Ph.D.

Boris Magasanik Professor of Biology
Massachusetts Institute of Technology

Donald W. Pfaff, Ph.D.

Professor of Neurobiology and Behavior
Rockefeller University

Janet D. Rowley, M.D.

Blom-Riese Distinguished Service Professor of Medicine
Section of Hematology/Oncology
University of Chicago School of Medicine

Jerome F. Strauss III, M.D., Ph.D.

Luigi Mastroianni Jr. Professor
Director, Center for Research on Reproduction
and Women's Health
University of Pennsylvania School of Medicine

Ian A. Wilson, D.Phil.

Professor of Molecular Biology
Scripps Research Institute

Jean D. Wilson, M.D.

Charles Cameron Sprague Distinguished Chair
in Biomedical Science
Chief, Division of Endocrinology and Metabolism
University of Texas Southwestern Medical Center-Dallas

Dyann F. Wirth, Ph.D. (Co-Chair, 1995-97)

Professor of Tropical Health
Harvard School of Public Health

**Dr. Paul Berg is on leave from the committee.*

Hitchings-Elion Fellowships/Wellcome Research Travel Grants

Mary Sue Coleman, Ph.D. (1993-97)
President
Professor of Biochemistry and Biology
University of Iowa

Joseph T. Coyle, M.D.
Professor and Chair of Psychiatry
Harvard Medical School

Frank M. Huennekens, Ph.D.
Member, Emeritus
Department of Molecular and Experimental Medicine
Scripps Research Institute

Beverly S. Mitchell, M.D.
Professor of Internal Medicine and Pharmacology
Chief, Division of Hematology/Oncology
University of North Carolina-Chapel Hill School
of Medicine

Richard V. Wolfenden, Ph.D.
Alumni Distinguished Professor of Biochemistry
and Biophysics
University of North Carolina-Chapel Hill School
of Medicine

Christopher Wylie, Ph.D. (Chair, effective 1997)
Martin Lenz Harrison Director Chair of Development
and Genetics
Institute of Human Genetics
University of Minnesota

Hans H. Zingg, M.D., Ph.D.
Director, Laboratory of Molecular Endocrinology
Royal Victoria Hospital
Canada

*Advisers from the Wellcome Trust, BWF's
sister philanthropy in the United Kingdom*

John Malin, D.Phil.
Assistant Coordinator of the History
of Medicine Programme
The Wellcome Institute for the History of Medicine

Mary E. Phillips, D.Phil. (Effective 1998)
Scientific Programme Manager (Physiology
and Pharmacology)

J. Michael Wilkinson, Ph.D. (1994-97)
Scientific Programme Manager (International)

Molecular Parasitology/Malaria

Stephen M. Beverley, Ph.D.
Brannecke Professor of Molecular Microbiology
Washington University School of Medicine

John Boothroyd, Ph.D.
Professor of Microbiology and Immunology
Stanford University School of Medicine

Daniel G. Colley, Ph.D.
Director, Division of Parasitic Diseases
Centers for Disease Control and Prevention

Alan Fairlamb, M.B., Ch.B., Ph.D.
Professor of Biochemistry
Wellcome Trust Principal Research Fellow
Medical Sciences Institute
University of Dundee
Scotland

Anthony Holder, Ph.D.
Head, Division of Parasitology
National Institute for Medical Research
England

Carole A. Long, Ph.D. (Chair)
Professor of Microbiology and Immunology
Allegheny University of the Health Sciences

Thomas Wellems, M.D., Ph.D.
Head, Malaria Genetics Section
Laboratory of Parasitic Diseases
National Institute of Allergy and Infectious Diseases
National Institutes of Health

Molecular Pathogenic Mycology

John E. Edwards Jr., M.D.

Chief, Division of Infectious Diseases
Professor of Medicine
Harbor-UCLA Medical Center
University of California-Los Angeles School of Medicine

June Kwon-Chung, Ph.D.

Senior Research Scientist
National Institute of Allergy and Infectious Diseases
National Institutes of Health

P. T. Magee, Ph.D. (Chair)

Professor of Genetics and Cell Biology
University of Minnesota

Juneann W. Murphy, Ph.D.

Professor of Microbiology
University of Oklahoma Health Sciences Center

Phillips W. Robbins, Ph.D.

Professor of Biochemistry
Center for Cancer Research
Massachusetts Institute of Technology

Pharmacological and Toxicological Sciences

PHARMACOLOGICAL SCIENCES PANEL

T. Kendall Harden, Ph.D.

Professor of Pharmacology
University of North Carolina-Chapel Hill School
of Medicine

Lee Limbird, Ph.D.

Professor and Chair of Pharmacology
Vanderbilt University Medical Center

Victor Ling, Ph.D.

Vice President, Research
British Columbia Cancer Research Centre
Canada

Gregory Petsko, Ph.D.

Lucille P. Markey Professor of Biochemistry
and Chemistry
Director, Rosenstiel Basic Medical Sciences Research
Center
Brandeis University

Palmer Taylor, Ph.D. (Co-Chair)

Sandra and Monroe Trout Professor and Chair
of Pharmacology
University of California-San Diego School of Medicine

Jeffrey M. Trent, Ph.D.

Scientific Director, Division of Intramural Research
National Human Genome Research Institute
National Institutes of Health

TOXICOLOGICAL SCIENCES PANEL

Christopher Goetz, M.D.

Professor of Neurological Sciences
Rush-Presbyterian-St. Luke's Medical Center

Barbara F. Hales, Ph.D.

Professor of Pharmacology and Therapeutics
McGill University Faculty of Medicine
Canada

Philip Hanawalt, Ph.D. (Co-Chair)

Professor of Biology
Stanford University

Stephen H. Safe, D.Phil.

Sid Kyle Professor of Toxicology
Texas A&M University College of Veterinary Medicine

Thomas J. Slaga, Ph.D.

Chair, Center for Cancer Causation and Prevention
AMC Cancer Research Center

Clinical Scientist Awards in Translational Research

Joseph R. Bertino, M.D.

Head, Program in Molecular Pharmacology
and Therapeutics
Memorial Sloan-Kettering Cancer Center

Pamela B. Davis, M.D., Ph.D. (Chair)

Professor of Pediatrics
Case Western Reserve University School of Medicine

Susan George, M.D.

Professor of Medicine and Pharmacology
University of Toronto Faculty of Medicine
Canada

Judith G. Hall, M.D.

Professor and Head of Pediatrics
University of British Columbia Faculty of Medicine
Canada

Rochelle Hirschhorn, M.D.

Professor of Medicine and Cell Biology
New York University Medical Center

Barton A. Kamen, M.D., Ph.D.

American Cancer Society Clinical Research Professor
Carl B. and Florence E. King Foundation Distinguished
Chair of Pediatric Oncology Research
University of Texas Southwestern Medical Center-Dallas

Paul S. Lietman, M.D., Ph.D.

Wellcome Professor of Clinical Pharmacology
Director, Division of Clinical Pharmacology
Johns Hopkins University School of Medicine

John C. Marshall, M.D., Ph.D.

Arthur and Margaret Ebbert Professor of Medical Science
Director, Center for Research in Reproduction
University of Virginia Health Sciences Center

Jerry R. McGhee, Ph.D.

Professor and Director, Immunobiology Vaccine Center
University of Alabama-Birmingham School of Medicine

Judith L. Swain, M.D.

Arthur L. Bloomfield Professor and Chair
Department of Medicine
Stanford University Medical Center

Interfaces between the Physical/Chemical/Computational Sciences and the Biological Sciences

Robert Baldwin, Ph.D.

Professor of Biochemistry
Stanford University School of Medicine

Jeremy M. Berg, Ph.D.

Professor and Director of Biophysics
and Biophysical Chemistry
Johns Hopkins University School of Medicine

Jeffrey I. Gordon, M.D.

Alumni Professor and Head of Molecular Biology
and Pharmacology
Washington University School of Medicine

John J. Hopfield, Ph.D. (Chair)

Professor of Molecular Biology
Princeton University

James Hudspeth, M.D., Ph.D.

Investigator, Howard Hughes Medical Institute
Professor and Head, Laboratory of Sensory Neuroscience
Rockefeller University

Nancy Kopell, Ph.D.

Professor of Mathematics
Boston University

Paul C. Lauterbur, Ph.D.

Professor and Director
Biomedical Magnetic Resonance Laboratory
University of Illinois-Urbana/Champaign

Tamar Schlick, Ph.D.

Professor of Chemistry and Mathematics
Courant Institute of Mathematical Sciences
New York University

Science Education

Carolyn Blackmon

Past Education Department Chair
Field Museum

John E. Burris, Ph.D. (Chair)

Director and Chief Executive Officer
Marine Biological Laboratory

Charles R. Eilber*

President
Charles Eilber Associates Inc.

Carl W. Gottschalk, M.D. (Deceased)

Past Kenan Professor of Medicine and Physiology
University of North Carolina-Chapel Hill School
of Medicine

Samuel Houston, Ed.D.

Executive Director, Education Standards
and Accountability Commission
State of North Carolina

Elmima Johnson, Ph.D.

Staff Associate, Office of Assistant Director
for Education and Human Resources
National Science Foundation

Shirley Malcolm, Ph.D.

Head, Directorate for Education and Human Resources
American Association for the Advancement of Science

Gail Morse

Media Specialist
Hunter Elementary School
Partnerships/Technology Consultant
Public School Forum of North Carolina

Sally G. Shuler

Director for Development, External Relations,
and Outreach
National Science Resources Center

**Charles R. Eilber is on leave from the committee.*

Board of Directors



Mary Ellen Avery, M.D.

*Thomas Morgan Rotch Distinguished Professor of Pediatrics
Harvard Medical School*

Dr. Avery received her undergraduate degree from Wheaton College in Massachusetts and medical degree from Johns Hopkins University. She is a recipient of the National Medal of Science, and she is a member of the National Academy of Sciences, the Institute of Medicine, and the American Academy of Arts and Sciences. Dr. Avery is the Thomas Morgan Rotch Distinguished Professor of Pediatrics at Harvard Medical School and physician-in-chief emeritus at Children's Hospital, in Boston. A pediatrician, her research has focused primarily on premature infants' respiratory distress syndrome, its prevention, and its treatment with pulmonary surfactant replacement. Dr. Avery joined the BWF board in 1993.



Enriqueta C. Bond, Ph.D.

*President
Burroughs Wellcome Fund*

Dr. Bond received her undergraduate degree from Wellesley College and Ph.D. in molecular biology and biochemical genetics from Georgetown University. She is a member of the Institute of Medicine, the American Association for the Advancement of Science, the American Society for Microbiology, and the American Public Health Association. Dr. Bond serves on the Board of Regents of the National Library of Medicine and on the Board of Scientific Counselors for the National Center for Infectious Diseases at the Centers for Disease Control and Prevention. She also serves on the board of the Institute of Medicine's Division of Health Sciences Policy and on the board and executive committee of the Society for the Advancement of Research on Women's Health. She joined the staff of the Institute of Medicine in 1979 and was named executive officer in 1989. Dr. Bond became president of the Burroughs Wellcome Fund in July 1994.



Stephen D. Corman (Treasurer)

Mr. Corman is a graduate of Indiana University and a certified public accountant. He has worked for Price Waterhouse and as chief financial officer and treasurer of Cooper, USA, Inc. Mr. Corman joined Burroughs Wellcome Co. in 1975, and he was named vice president of finance in 1986 and chief financial officer in 1989. In 1995, he became executive vice president and chief financial officer of Coastal Physician Group Inc. He currently is pursuing other business and civic interests. Mr. Corman joined the BWF board in 1990.

Gertrude B. Elion, D.Sc.

1988 Nobel Laureate in Physiology or Medicine

Scientist Emeritus

Glaxo Wellcome Inc.

Dr. Elion received her undergraduate degree from Hunter College and master's degree in chemistry from New York University, and she holds honorary doctorate degrees from numerous universities. Dr. Elion shared the 1988 Nobel Prize in Physiology or Medicine and is a recipient of the National Medal of Science. She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and she is a foreign member of the Royal Society. Dr. Elion worked for more than 50 years at Burroughs Wellcome Co., where she was named scientist emeritus in 1983. She currently is scientist emeritus at Glaxo Wellcome Inc. and a medical research professor of pharmacology and medicine at Duke University. Her research has focused on purine biochemistry and pharmacology and on the chemotherapy of cancer and diseases caused by viruses and protozoa. Dr. Elion joined the BWF board in 1992.



Henry G. Friesen, M.D.

President

Medical Research Council of Canada

Dr. Friesen received his undergraduate and medical degrees from the University of Manitoba. He is a fellow of the Royal College of Physicians and Surgeons of Canada and of the Royal Society of Canada, an officer of the Order of Canada, and a foreign fellow of the National Academy of Sciences. He served as professor and head of the department of physiology and as professor of medicine at the University of Manitoba. In 1991, Dr. Friesen became president of the Medical Research Council of Canada. A specialist in endocrinology, his research has focused on the mechanisms of action of prolactin and growth hormone. Dr. Friesen joined the BWF board in September 1995.



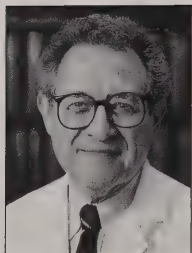
Samuel L. Katz, M.D. (Chair)

Wilburt C. Davison Professor and Chairman Emeritus of Pediatrics

Duke University School of Medicine

Dr. Katz received his undergraduate degree from Dartmouth College and medical degree from Harvard Medical School. He is a member of the Institute of Medicine. He is a scientific councilor at numerous biomedical institutions, and he chairs advisory committees and panels for the Centers for Disease Control and Prevention and for the World Health Organization. Dr. Katz is the Wilburt C. Davison Professor and Chairman Emeritus of Pediatrics at Duke University School of Medicine. Long interested in infectious diseases and vaccines, he currently is focusing on the possibility of global elimination of measles early in the next century, on the control of other vaccine-preventable diseases in both the United States and the developing world, and on clinical investigations of pediatric HIV/AIDS. Dr. Katz joined the BWF board in 1992 and has been its chair since April 1995.

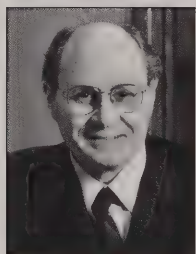




David M. Kipnis, M.D.

*Distinguished University Professor of Medicine
Washington University School of Medicine*

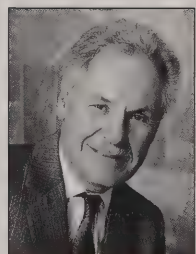
Dr. Kipnis received his undergraduate degree from Johns Hopkins University and medical degree from the University of Maryland. He is a member of the National Academy of Sciences, the Institute of Medicine, and the American Academy of Arts and Sciences. Dr. Kipnis is Distinguished University Professor of Medicine at Washington University School of Medicine. His research has focused on the immunological and pathophysiological mechanisms responsible for the various forms of diabetes mellitus. Dr. Kipnis joined the BWF board in 1994.



Daniel Nathans, M.D.

*1978 Nobel Laureate in Physiology or Medicine
University Professor of Molecular Biology and Genetics
Johns Hopkins University School of Medicine*

Dr. Nathans received his undergraduate degree from the University of Delaware and medical degree from Washington University. He shared the 1978 Nobel Prize in Physiology or Medicine and is a recipient of the National Medal of Science. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences. Dr. Nathans is University Professor of Molecular Biology and Genetics and a Howard Hughes Medical Institute senior investigator at Johns Hopkins University School of Medicine. His research has focused on viruses that cause tumors in animals, and he currently is studying cellular responses to growth factors. Dr. Nathans joined the BWF board in 1994.



Joseph S. Pagano, M.D.

*Professor and Director Emeritus, Lineberger Comprehensive Cancer Center
University of North Carolina-Chapel Hill School of Medicine*

Dr. Pagano received his undergraduate degree from the University of Rochester and medical degree from Yale University. He is a member of the Royal Society of Medicine, the Association of American Physicians, and the American Society of Microbiology. He is chair of the Association of American Cancer Institutes and has served as president of the International Association for Research on Epstein-Barr Virus. Dr. Pagano is the Lineberger Professor of Cancer Research and director emeritus of the Lineberger Comprehensive Cancer Center at the University of North Carolina-Chapel Hill School of Medicine. His research has focused on the regulation of Epstein-Barr viral gene expression and on the mechanisms of actions of antiviral drugs. Dr. Pagano joined the BWF board in 1993.

Philip R. Tracy

Mr. Tracy received his undergraduate degree from the University of Nebraska and law degree from George Washington University. He joined Burroughs Wellcome Co. in 1974 as assistant general counsel, and he served as the company's president and chief executive officer from 1989 until its acquisition in 1995. Mr. Tracy currently is associated with the North Carolina-based law firm of Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P. Among other business interests, he serves on the board of directors of numerous organizations, and he chairs the board of SunPharm Corporation, a drug-development company. Mr. Tracy joined the BWF board in 1989.



Governor Lowell P. Weicker Jr.

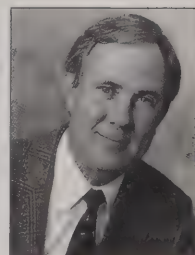
Gov. Weicker received his undergraduate degree from Yale University and law degree from the University of Virginia, and he holds honorary degrees from more than a dozen colleges and universities. He has served in the Connecticut House of Representatives, the U.S. House of Representatives, the U.S. Senate, and as governor of Connecticut. During this time, he fostered support for the National Institutes of Health and numerous other major research and health programs. Among many honors, Gov. Weicker has received an Albert Lasker Public Service Award, and the National Institutes of Health and the University of Connecticut have dedicated buildings in his name. He founded Research!America, a biomedical research advocacy coalition, and he currently is a visiting professor at the University of Virginia. Gov. Weicker joined the BWF board in 1996.



Jerry L. Whitten, Ph.D.

*Dean of Physical and Mathematical Sciences and Professor of Chemistry
North Carolina State University*

Dr. Whitten received his undergraduate degree and Ph.D. in chemistry from Georgia Institute of Technology, and he was a research associate at Princeton University. He is a member of the New York Academy of Sciences, the American Chemical Society, and the American Physical Society, and he is a recipient of an Alexander von Humboldt U.S. Senior Scientist award. Dr. Whitten is dean of physical and mathematical sciences and professor of chemistry at North Carolina State University. A theoretical chemist, his research has focused on electronic structure theory and its application to materials and catalytic processes. Dr. Whitten joined the BWF board in 1993.



Staff



Executive

Left to right:

Enriqueta C. Bond, Ph.D., President

Scott G. Schoedler, Vice President, Finance

Martha G. Peck, Vice President, Programs



Finance and Administration

Bottom row, left to right:

Kenneth P. Browndorf, Accounting Manager

Janet Cobbs, Administrative Assistant/Document Processing

Middle row, left to right:

Jane S. Edwards, Secretary

Martie H. Gregory, Senior Manager, Office and Network Administration

Top row, left to right:

Susan Kauer, Accountant

Kristin Wahlne, Secretary

Not shown:

Judy McConnell, Librarian/Secretary (Joined BWF in December 1997)



Programs and Communications

Bottom row, left to right:

Martin Ionescu-Pioggia, Ph.D., Program Officer

D. Carr Agyapong, Senior Program and Communications Officer

Victoria P. McGovern, Ph.D., Program Officer

Middle row, left to right:

Debra A. Linkous, Program Associate

Catherine L. Voron, Meeting Professional/Program Associate

Rolly L. Simpson Jr., Program Associate

Top row, left to right:

Tom Burroughs, Communications Manager

Jennifer R. Wortman, Program Associate (Left BWF in November 1997)

Nancy S. Sung, Ph.D., Program Officer

Melanie B. Scott, Program Assistant

Not shown:

Jean Kramarik, Program Associate (Joined BWF in December 1997)

Contact Information for Major Programs

(E-mail addresses and program areas)

D. Carr Agyapong, cagyapong@bwfund.org
Science education

Martin Ionescu-Pioggia, Ph.D., mionescu@bwfund.org
Career development, reproductive science

Victoria P. McGovern, Ph.D., vmcgovern@bwfund.org
Emerging infectious diseases, pharmacological and toxicological sciences

Nancy S. Sung, Ph.D., nsung@bwfund.org
Interfaces between the physical/chemical/computational sciences and the biological sciences, translational research

Jean Kramarik, jkramarik@bwfund.org
Emerging infectious diseases, pharmacological and toxicological sciences, environment for science

Debra A. Linkous, dlinkous@bwfund.org
Interfaces between the physical/chemical/computational sciences and the biological sciences, translational research, science education, environment for science

Rolly L. Simpson Jr., rsimpson@bwfund.org
Career development, reproductive science, environment for science

TO OBTAIN INFORMATION ABOUT PROGRAMS

Burroughs Wellcome Fund
4709 Creekstone Drive, Suite 100
Durham, NC 27703
Telephone: (919) 991-5100
Fax: (919) 941-5884

Information about BWF and its award programs can be obtained electronically by sending an e-mail message to mailback@bwfund.org—type the word “menu” on the subject line for a list of programs. To request a specific program brochure to be delivered by regular mail, or to send a message to a BWF program officer, access the Fund at info@bwfund.org.

Program information is available on BWF's website at <http://www.bwfund.org>



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WORLD WIDE WEB <http://www.bwfund.org>